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RECORDS OF THE PYGMY KILLER WHALE, *FERESA ATTENUATA*, FROM SOUTHERN AFRICA, WITH NOTES ON BEHAVIOUR IN CAPTIVITY

By

PETER B. BEST

Cape Town Kaapstad

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Peter B. Best

South African Museum, Cape Town

(With 9 plates, 2 figures and 5 tables)

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Introduction

In 1827 Dr J. E. Gray described a new species of dolphin *Delphinus intermedius* from a skull of unknown locality, whose distinctness he later recognized by placing it in a separate genus *Feresa* (1871). The same author described a second species, *F. attenuata*, in 1874 from a skull collected in the 'South Seas', though subsequent reviewers (Flower, 1883; True, 1889) have tended to regard *intermedia* and *attenuata* as conspecific. These two skulls remained the only known specimens of the genus until 1954, when Yamada described a strange dolphin from Taiji, Japan, that proved to be a specimen of *Feresa* and which provided the first information on its external appearance and post-cranial skeleton. The skull of a fourth specimen captured at Yenn, Senegal (Cadenat, 1958), was compared with the types of *intermedia* and *attenuata* by Fraser (1960), who concluded that all three specimens belonged to the same species for which he proposed *F. attenuata* as the valid name (*F. intermedia* being preoccupied). Subsequently a fifth specimen was captured off Hawaii (Pryor, Pryor & Norris, 1965), and Nishiwaki, Kasuya, Kamiya, Tobayama & Nakajima (1965)

Ann. S. Afr. Mus. **57** (1), 1970, 1–14, 9 pls, 2 figs, 5 tables.

provided valuable information on the external appearance and skeletal characters from a series of 14 animals captured at Futo, Japan, in 1963.

Apart from the type skull of *attenuata* from the 'South Seas', there had been no further records of *Feresa* from the southern hemisphere until January, 1968, when five animals stranded in the lagoon at Lüderitz, South West Africa (26°36′S., 15°15′E). A sixth specimen that beached itself at Richard's Bay, Natal (28°36′S., 32°23′E) on 16 May, 1968, is also the first record from the Indian ocean. The six specimens concerned have been numbered as shown in table 1. The skeletons of numbers 1 to 5 were collected, but the only skeletal material preserved from number 6 was the terminal portion of the rostrum and mandibles plus associated teeth.

TABLE 1

Strandings of *Feresa attenuata* in southern Africa

Specimen number	Total length (feet & inches)	Sex	Locality	Date	Catalogue number
1	6′ 4½″	—	Lüderitz lagoon, S.W.A.	Jan., 1968	Luderitz museum
2	7′ 10″	Female	,,	,,	SAM 35576
3	6′ 10½″	—	,,	,,	SAM 35577
4	6′ 3″	Male	,,	,,	SAM 35578
5	7′ 9½″	Female	,,	,,	Staatsmuseum, Stuttgart
6	7′ 11½″	Female	Richard's Bay, Natal	16 May, 1968	SAM 35601

While this paper was in press, a seventh specimen came ashore at Sunset Beach, Sea Point, Cape Town (33°55′S., 18°23′E) on 2 January 1970. This was a female 7 feet 4 inches long. The skeleton was collected (catalogue number SAM 35870) but not cleaned in time to be described in this paper.

The presence of the species in the Indian ocean is confirmed by the sighting of a school of 11 animals from the whale-catcher 'Edwin Cook' on 16 August, 1969, in the position 31°35′S., 29°53′E, while the author was engaged on a whale-marking cruise off Durban.

EXTERNAL APPEARANCE

The animals stranded at Lüderitz were examined only in July, or about six months after they had beached themselves. As a consequence they had undergone so much decomposition and dehydration that accurate information on their external appearance was difficult to obtain, and even the sex of two animals could not be determined. Very fortunately, however, two colour photographs were taken of one of the animals shortly after it had stranded, and from these it is possible to gain some idea of their external appearance. The

Richard's Bay specimen was collected while still fresh, and three colour photographs of the frozen animal are available. Furthermore, a full-size, glass-fibre cast of the body was prepared, from which certain external measurements were taken. These are listed in table 2 with those from the Sunset Beach, 14 Futo and the single Hawaiian specimens for comparison. The Sunset Beach animal was kept in captivity for six days so that the colour pattern of the living animal was observed.

TABLE 2

Body measurements of *Feresa attenuata*

	Richard's Bay		Sunset Beach		Futo (Nishiwaki *et al.*, 1965) %		Hawaii (Pryor *et al.*, 1965) %
Measurement	cm	%	cm	%	Range	Mean	
Tip of snout to notch in flukes ..	239	100	223·5	100	(208–244)	(223)	(215·9)
,, ,, ,, to centre of eye ..	25	10·5	23·5	10·5	8·1–11·4	9·8	12·0
,, ,, ,, to centre of blowhole	23·5	9·8	26·4	11·8	6·7–11·9	9·6	10·6
,, ,, ,, to angle of gape ..	21·2	8·9	19·1	8·5	—	—	—
,, ,, ,, to anterior insertion of flipper	43·8	18·3	47·0	21·0	16·8–21·6	19·5	18·2
,, ,, ,, to tip of dorsal fin	134·5	56·3	142·2	63·6	54·3–61·8	58·1	56·2
Flipper, anterior insertion to tip	50·5	21·1	45·7	20·4	14·7–22·2	19·7	21·2
,, axilla to tip	34·8	14·6	35·9	16·1	13·8–19·0	15·4	15·4
,, maximum width ..	16·3	6·8	15·2	6·8	5·8–7·0	6·4	6·5
Dorsal fin, height	29·5	12·3	25·1	11·2	9·4–11·6	10·2	10·0
,, ,, length of base ..	35·5	14·0	33·0	14·8	14·0–19·4	16·7	17·4
Width of flukes, tip to tip ..	59·0	24·7	54·6	24·4	23·0–28·4	25·8	24·9

There appears to be no significant difference between the external appearance of these pygmy killer whales and those previously described. The similarity in body shape to *Pseudorca* is striking, though the flippers have a convex leading edge and resemble those of *Grampus* in shape. The dorsal fin is also more like that of Risso's dolphin, being relatively larger than that of *Pseudorca* with the tip pointed and more erect. In the Richard's Bay specimen the fin is apparently higher than in any animal so far described. A further point of similarity with *Grampus* is the noticeable tapering of the body behind the dorsal fin. A narrow groove runs mid-ventrally from the chest between the flippers to the genital aperture of the Richard's Bay and Sunset Beach specimens, and the irregular indentations to the posterior edges of the dorsal fin, flippers and flukes mentioned by previous authors are also seen in most of the animals.

Nishiwaki *et al.* (1965) suggested that male *Feresa* might grow slightly bigger than females, as they measured no mature female more than 227 cm in length whereas males apparently grew to 244 cm. Three of the females examined in this report are 7 feet 9½ inches to 7 feet 11½ inches (237 to 243 cm) long, indicating that there is in fact little difference in the adult size of the two sexes.

TABLE 3

Skull measurements of *Feresa attenuata* from Lüderitz

Measurement	Specimen 1		Specimen 2		Specimen 3		Specimen 4		Specimen 5	
	mm	(% CBL)	mm	(% CBL)	mm	(% CBL)	mm	(% CBL)	mm	(% CBL)
1. Total or condylobasal length (CBL)	371	(100)	401	(100)	396	(100)	352	(100)	385	(100)
2. Length of rostrum (median)	164	(44·2)	190	(47·4)	191	(48·2)	159	(45·2)	171	(44·4)
3. Breadth of rostrum at base	120	(32·3)	129	(32·2)	123	(31·1)	107	(30·4)	125	(32·5)
4. ,, ,, ,, 60 mm ant. to antorbital notch	96	(25·9)	111	(27·7)	98	(24·7)	88	(25·0)	101	(26·2)
5. ,, ,, ,, at middle	87	(23·5)	96	(23·9)	88	(22·2)	82	(23·3)	93	(24·2)
6. Premaxillae, breadth at middle of rostrum	60	(16·2)	65	(16·2)	64	(16·2)	52	(14·8)	66	(17·1)
7. ,, greatest breadth	92	(24·8)	105	(26·2)	100	(25·3)	89	(25·3)	99	(25·7)
8. ,, minimum breadth near base of rostrum	62	(16·7)	69	(17·2)	70	(17·7)	55	(15·6)	66	(17·1)
9. ,, length (left)	262	(70·6)	297	(74·1)	293	(74·0)	255	(72·4)	265	(68·8)
(right)	289	(77·9)	325	(81·0)	315	(79·5)	281	(79·8)	296	(76·9)
10. Greatest breadth of nasals	—	—	—	—	62	(15·7)	59	(16·8)	61	(15·8)
11. Breadth of superior nares	49	(13·0)	59	(14·7)	57	(14·4)	53	(15·1)	56	(14·5)
12. Tip of rostrum to bottom of maxillary notch (left)	175	(47·2)	200	(49·9)	198	(50·0)	163	(46·3)	182	(47·3)
(right)	175	(47·2)	202	(50·4)	200	(50·5)	168	(47·7)	184	(47·8)
13. ,, ,, ,, to anterior end of vomer	30	(8·1)	38	(9·5)	39	(9·8)	—	—	27	(7·0)
14. ,, ,, ,, to anterior end of presphenoid	162	(43·7)	182	(45·4)	180	(45·5)	160	(45·5)	160	(41·6)
15. ,, ,, ,, to anterior margin of superior nares	225	(60·6)	252	(62·8)	251	(63·4)	212	(60·2)	225	(58·4)
16. ,, ,, ,, to posterior end of mesethmoid	265	(71·4)	—	—	295	(74·5)	255	(72·4)	277	(71·9)
17. ,, ,, ,, to posterior median end of maxillae on palate	174	(46·9)	191	(47·6)	191	(48·2)	162	(46·0)	184	(47·8)
18. ,, ,, ,, to vomerine process between palatines and pterygoids	209	(56·3)	235	(58·6)	232	(58·6)	197	(56·0)	215	(55·8)
19. ,, ,, ,, to posterior end of vomer on cranial base (median)	271	(73·0)	293	(73·1)	292	(73·7)	255	(72·4)	282	(73·2)
20. ,, ,, ,, to bottom of right tubal notch	226	(60·9)	250	(62·3)	252	(63·6)	215	(61·1)	239	(62·1)
21. Breadth across middle of orbits	220	(59·3)	247	(61·6)	235	(59·3)	212	(60·2)	235	(61·3)
22. ,, preorbital	215	(58·0)	243	(60·6)	228	(57·6)	208	(59·1)	230	(59·7)
23. ,, postorbital	240	(64·7)	261	(65·1)	245	(61·9)	224	(63·6)	248	(64·4)
24. ,, zygomatic	238	(64·2)	267	(66·6)	249	(62·9)	228	(64·8)	253	(65·7)
25. ,, parietal	172	(46·4)	183	(45·6)	173	(43·7)	156	(44·3)	160	(41·6)
26. ,, across posterior margins of temporal fossae	156	(42·0)	170	(42·4)	165	(41·7)	152	(43·2)	152	(39·5)

Measurement	Specimen 1 mm	Specimen 1 (% CBL)	Specimen 2 mm	Specimen 2 (% CBL)	Specimen 3 mm	Specimen 3 (% CBL)	Specimen 4 mm	Specimen 4 (% CBL)	Specimen 5 mm	Specimen 5 (% CBL)
27. Height, including nasals	—	—	—	—	180	(45·5)	161	(45·7)	183	(47·5)
28. Temporal fossa, length (left)	85	(22·9)	88	(21·9)	79	(19·9)	77	(21·9)	92	(23·9)
(right)	90	(24·3)	80	(20·0)	78	(19·7)	76	(21·6)	90	(23·4)
29. „ „ depth (left)	59	(15·9)	60	(15·0)	58	(14·6)	54	(15·3)	64	(16·6)
(right)	67	(18·1)	64	(16·0)	59	(14·9)	59	(16·8)	69	(17·9)
30. Maxillary tooth-row, length (left)	110	(29·6)	130	(32·4)	130	(32·8)	—	—	119	(30·9)
(right)	109	(29·4)	130	(32·4)	134	(33·8)	—	—	120	(31·2)
31. Distance from first tooth to bottom of maxillary notch (left)	174	(46·9)	203	(50·6)	202	(51·0)	—	—	184	(47·8)
(right)	179	(48·2)	205	(51·1)	205	(51·8)	—	—	187	(48·6)
32. Breadth of occipital foramen	40	(10·8)	46	(11·5)	46	(11·6)	43	(12·2)	43	(11·2)
33. Height of occipital foramen	39	(10·5)	41	(10·2)	39	(9·8)	39	(11·1)	38	(9·9)
34. Breadth across occipital condyles	90	(24·3)	104	(25·9)	90	(22·7)	85	(24·1)	96	(24·9)
35. Length of occipital condyle (left)	58	(15·6)	61	(15·2)	59	(14·9)	57	(16·2)	60	(15·6)
(right)	55	(14·8)	61	(15·2)	61	(15·4)	56	(15·9)	59	(15·3)
36. Length of mandibular ramus (left)	291	(78·4)	315	(78·6)	309	(78·0)	—	—	—	—
(right)	292	(78·7)	314	(78·3)	310	(78·3)	282	(80·1)	302	(78·4)
37. Tip of mandible to coronoid process (left)	260	(70·1)	280	(69·8)	270	(68·2)	—	—	—	—
(right)	255	(68·7)	282	(70·3)	275	(69·4)	251	(71·3)	260	(67·5)
38. Length of symphysis	31	(8·4)	30	(7·5)	39	(9·8)	28	(8·0)	29	(7·5)
39. Length of mandibular tooth-row (left)	130	(35·0)	150	(37·4)	150	(37·9)	—	—	—	—
(right)	131	(35·3)	150	(37·4)	150	(37·9)	141	(40·1)	132	(34·3)
40. Depth between angle and coronoid process (left)	87	(23·5)	92	(22·9)	93	(23·5)	—	—	93	(24·2)
(right)	88	(23·7)	92	(22·9)	93	(23·5)	—	—	94	(24·4)
41. Breadth across mandibular condyles	—	—	233	(58·1)	218	(55·1)	—	—	—	—
42. Length of tympanic bulla (left)	41	(11·1)	43	(10·7)	42	(10·6)	42	(11·9)	42	(10·9)
(right)	41	(11·1)	43	(10·7)	42	(10·6)	41	(11·6)	42	(10·9)
43. Greatest breadth of tympanic bulla (left)	31	(8·4)	31	(7·7)	31	(7·8)	31	(8·8)	29	(7·5)
(right)	30	(8·1)	31	(7·7)	31	(7·8)	29	(8·2)	29	(7·5)
44. Number of alveoli[1]	$\frac{9:8}{13:13}$		$\frac{10:9}{13:12}$		$\frac{9:9}{12:12}$				$\frac{9:9}{-:11}$	

---

[1] Specimen number 6 .. .. $\frac{11:11}{13:13}$

Table 4

Comparison of skull measurements of *Feresa attenuata* (all expressed as percentages of CBL)

Measurement number		Lüderitz (n = 5)		Futo (n = 13) (Nishiwaki *et al.*, 1965)		BM 362A (Fraser, 1960)	BM 1672A (Fraser, 1960)	Taiji (Yamada, 1954)	Yenn (Fraser, 1960)	Hawaii (Pryor *et al.*, 1965)
		Range	Mean	Range	Mean					
1.		(352–401)	(381)	(356–395)	(374)	(358)	(346)	(385)	(346)	(355)
2.		44·2–48·2	45·9	44·7–49·2	47·4	48·0	47·9	47·8	47·4	64·5[1]
3.		30·4–32·5	31·7	27·7–31·8	30·2	32·7	30·6	30·2	32·1	31·8
4.		24·7–27·7	25·9	—	—	26·8	23·7	—	24·6	26·5
5.		22·2–24·2	23·4	22·9–25·1	24·1	24·6	21·4	23·1	22·8	23·6
6.		14·8–17·1	16·1	15·0–17·7	16·5	16·5	15·8	14·8	15·6	17·8
7.		24·8–26·2	25·5	23·4–26·2	24·5	25·1	26·0	—	25·1	25·6
8.		15·6–17·7	16·9	13·9–15·9	15·1	—	—	—	—	—
9.	(left)	68·8–74·1	72·0	70·5–77·0	73·5	—	—	71·5	—	—
	(right)	76·9–81·0	79·0	77·4–82·5	79·3	—	—	78·2	—	—
10.		15·7–16·8	16·1	—	—	—	—	14·3	—	—
11.		13·0–15·1	14·3	12·4–14·5	13·2	—	—	13·3	—	—
12.		46·3–50·5	48·4	48·7–52·2	50·2	—	—	51·6	—	—
13.		7·0–9·8	8·6	7·8–12·6	9·8	—	—	10·1	—	—
14.		41·6–45·5	44·3	—	—	—	—	42·6	—	—
15.		58·4–63·4	61·1	56·9–63·2	61·7	—	—	59·2	—	—
16.		71·4–74·5	72·6	—	—	—	—	75·0	—	—
17.		46·0–48·2	47·3	45·8–50·1	48·5	—	—	46·0	—	—
18.		55·8–58·6	57·1	—	—	—	—	56·6	—	—
19.		72·4–73·7	73·1	74·0–76·4	75·2	—	—	75·0	—	—
20.		60·9–63·6	62·0	—	—	—	—	62·3	—	—
21.		59·3–61·6	60·3	53·7–60·7	57·3	58·9	57·2	56·1	56·1	—
22.		57·6–60·6	59·0	—	—	57·8	57·8	—	54·3	—
23.		61·9–65·1	63·9	59·2–66·3	62·4	66·2	62·7	62·3	61·3	—
24.		62·9–66·6	64·8	60·3–66·9	62·8	66·5	63·6	61·5	61·3	66·5
25.		41·6–46·4	44·3	—	—	46·6	45·6	44·5	44·2	46·0
26.		39·5–43·2	41·6	38·4–44·0	41·7	—	—	40·3	—	—
27.		45·5–47·5	46·2	47·2–53·4	49·8	—	—	46·0	—	—

Measurement number		Lüderitz (n = 5)		Futo (n = 13) (Nishiwaki *et al.*, 1965)		BM 362A (Fraser, 1960)	BM 1672A (Fraser, 1960)	Taiji (Yamada, 1954)	Yenn (Fraser, 1960)	Hawaii (Pryor *et al.*, 1965)
		Range	Mean	Range	Mean					
28.		19·7–24·3	22·0	22·0–27·9	25·2	—	—	24·2	—	—
29.	(left)	14·6–16·6	15·5	16·9–19·4	18·1	—	—	17·4	—	—
	(right)	14·9–18·1	16·7	17·6–23·7	20·3	—	—	19·8	—	—
30.		29·4–33·8	31·6	27·6–33·3	30·5	32·4–35·2	33·2–34·1	30·7–31·4	31·2–32·4	28·7–29·4
31.		46·9–51·8	49·5	46·0–49·2	47·8	—	—	—	—	—
32.		10·8–12·2	11·5	10·0–12·6	11·2	—	—	10·4	—	—
33.		9·8–11·1	10·3	9·2–11·8	10·3	—	—	—	—	—
34.		22·7–25·9	24·4	23·0–28·2	25·2	—	—	25·4	—	—
35.		14·8–16·2	15·4	13·4–17·1	15·1	—	—	14·3–14·5	—	—
36.		78·0–80·1	78·6	72·2–79·9	76·8	80·7	81·2	78·0	—	78·6–78·9
37.		67·5–71·3	69·4	—	—	—	—	68·3–68·8	—	—
38.		7·5–9·8	8·2	8·7–10·1	9·4	10·9	10·1	7·8	8·9	—
39.		34·3–40·1	36·9	31·5–38·4	35·8	36·8–37·9	37·6–38·2	36·4–36·9	36·4–36·7	38·5–38·7
40.		22·9–24·4	23·6	20·8–24·1	22·4	22·1[2]	21·1[2]	21·3	20·2[2]	21·4–21·7[2]
41.		55·1–58·1	56·6	50·3–59·9	55·9	—	—	54·5	—	—
42.		10·6–11·9	11·0	10·2–11·4	10·7	—	—	10·1	—	—
43.		7·5–8·8	8·0	6·2–9·0	6·6	—	—	7·5–7·6	—	—
44.		8–11[3] / 11–13		8–10 / 11–13		10–11 / 10–11	11–12 / 12–13	10–11 / 13	10 / 13	9–10 / 13–13

---

[1] It is not known how this measurement was taken but it seems anomalous.
[2] Depth of mandible at coronoid.
[3] Including tooth count from Richard's Bay specimen.

The colour pattern of the Sunset Beach specimen agrees closely with that described by Nishiwaki *et al.* (1965). The pale grey lateral area is conspicuous in the living animal in water, particularly the upper margin which is sharply defined from the black dorsum: this feature was also most striking in the animals seen at sea off Durban in 1969. After death, however, the grey lateral area rapidly darkens and cannot be restored by wetting the skin (pl. 1). The irregular grey area on the chest between the flippers, extending as a narrow streak posteriorly, is visible both before and after death. In this animal there are also irregular white patches in the axillary region of the flippers. A narrow edge of white to both upper and lower lips forms a node at the tip of the snout in the Richard's Bay specimen, but the snout of the Sunset Beach animal is too damaged to determine this point. Both animals have a roughly elliptical white splash (pink in the living animal) enclosing both anal and genital apertures.

SKULL

All five *Feresa* skulls examined agree basically with the descriptions published by previous authors (True, 1889; Yamada, 1954; Fraser, 1960). A series of 44 measurements were taken (table 3), and are compared with similar skull measurements for the Futo, Taiji, Yenn and Hawaii material and the type specimens of *attenuata* and *intermedia* in table 4. For the majority of measurements there is excellent agreement between the different sets of skulls, but certain consistent differences are apparent in the Lüderitz specimens. The narrowing of the premaxillae near the base of the rostrum is generally less pronounced, and this seems to be supported by a visual comparison of four of the Lüderitz skulls (pl. 2) with photographs of two of the Futo whales (Nishiwaki *et al.*, 1965). The posterior median extension of the vomer on the base of the cranium is also less in all five Lüderitz specimens than in those from Futo and Taiji (see pl. 3). Furthermore, the temporal fossae are generally smaller than those from Futo or Taiji (pl. 4), particularly in depth, which as mentioned by Nishiwaki *et al.* (1965) is invariably greater on the right side of the skull. And lastly, the length of the mandibular symphysis appears to be less in the Lüderitz specimens, a feature also apparent from a comparison of the mandibles with the photographs published by Nishiwaki *et al.*, where the symphysis seems to extend back to the level of the posterior edge of the fourth alveolus, as against the third in the Lüderitz specimens (pl. 5). However, Yamada's (1954) specimen from Taiji appears to be intermediate in this respect.

Because of the close resemblance between the external appearance and general skull conformation of the Lüderitz specimens and those from other localities, it is doubtful whether these few differences in skull proportions can be considered as more than expressions of local geographic variation. No specific significance has been attached to them in this report.

The distinction of *F. attenuata* from *F. intermedia* was originally made because of the smaller size of its skull with a narrower rostrum, and smaller and more numerous (48 as against 43) teeth. The smaller size of the skull and teeth are clearly due to age differences between the two specimens, and the range of tooth numbers in recent *Feresa* specimens (41–48) embraces those of both type skulls. The narrower rostrum has usually been attributed to an age difference (Flower, 1883; Fraser, 1960; Nishiwaki *et al.*, 1965), but this now appears unlikely. The breadth of the rostrum at its base expressed as a percentage of the condylobasal length is plotted against condylobasal length in figure 1 and against body length in figure 2 for all known specimens of *Feresa*. There is no significant correlation for either set of data ($r : 0{\cdot}0937$, $p > 0{\cdot}9$ for figure 1 and $r : 0{\cdot}1784$, $p > 0{\cdot}4$ for figure 2). To avoid possible bias due to different methods of measurement, correlation coefficients have also been calculated for the Futo specimens alone, and once again these are not significant ($r : 0{\cdot}0776$, $p > 0{\cdot}8$ against condylobasal length and $r : 0{\cdot}4452$, $p > 0{\cdot}1$ against body length). It can only be concluded, therefore, that the narrowness of the rostrum of the type specimen of *F. attenuata* is not due to its lesser age, and that it merely falls within the range of intraspecific variation recorded for this character.

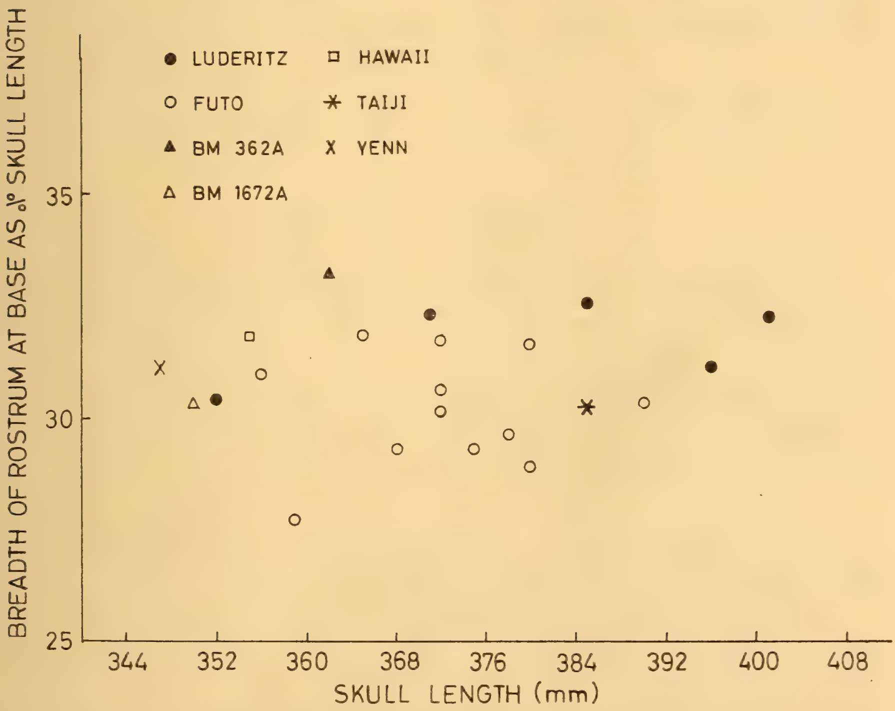

Fig. 1. Variation in breadth of rostrum at base with increasing skull length in *Feresa attenuata*

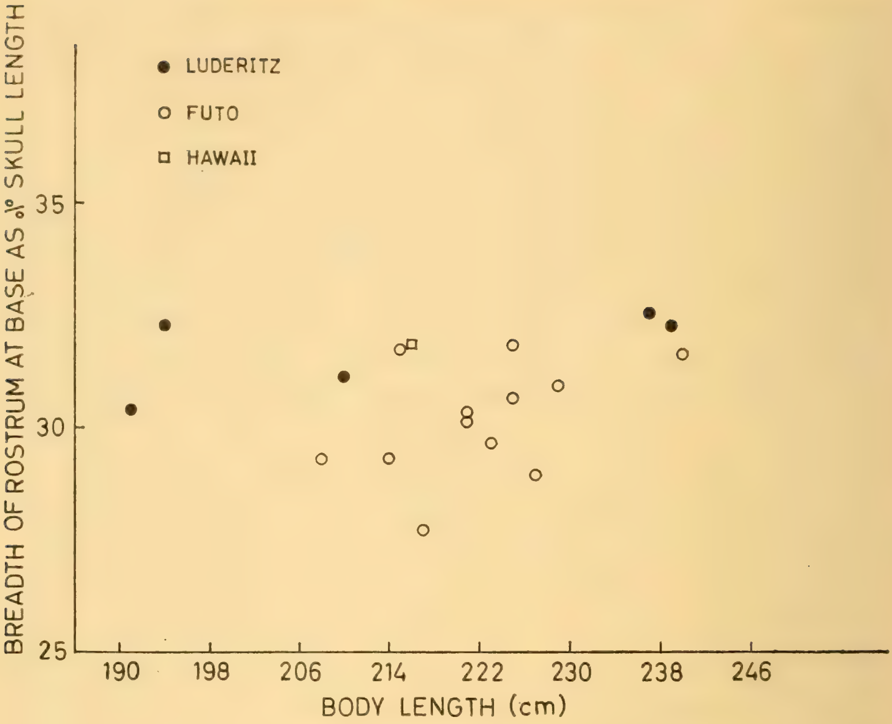

Fig. 2. Variation in breadth of rostrum at base with increasing body length in *Feresa attenuata*

Post-Cranial Skeleton

There also appears to be little difference between the skeletons of the Lüderitz *Feresa* specimens and those figured and described elsewhere. The major details of each are set out in table 5 and compared with similar data from Nishiwaki *et al.* (1965) and Yamada (1954). The tendency for the flippers of the Lüderitz dolphins to have a smaller number of phalanges, especially in the longest digits II and III, can be attributed to the advanced stage of decomposition and desiccation of these animals which had noticeably affected the tips of the flippers.

The following description applies only to the skeletons of specimens numbers 2 and 5, as these are the only physically mature individuals. The skeleton of number 2 is also illustrated in detail in plates 7 to 9.

Comparison of the dimensions of the vertebrae with similar measurements of the Taiji animal (Yamada, 1954) and three Futo specimens (Nishiwaki *et al.*, 1965) fails to illustrate any significant differences between them. The centra are at their thickest (33 mm) at about the fifteenth to eighteenth vertebrae in the column; the maximum total height of the vertebrae (176–181 mm) occurs

TABLE 5

Details of post-cranial skeleton of *Feresa attenuata*

Character	Specimen 1	Specimen 2	Specimen 3	Specimen 4	Specimen 5	Range of Futo specimens (Nishiwaki *et al.*, 1965)	Taiji specimen (Yamada, 1954)
Vertebral column							
Cervical	7	7	7	7	7	7	7
(fused)	(1–4)	(1–3, 4–5)	(1–3)	(1–3, 4–5)	(1–3, 4–5)	(1–3:1–6)	(1–3)
Thoracic	12	12	12	12	13	12–13	12
Lumbar	17	16	17	17	15	15–17	16
Caudal	24+	33	26+	32	33	32–34	32
Total	—	68	—	68	68	68–70	67
Ribs, pairs							
Vertebral	12	12	12	12	13	12–13	12
(two-headed)	(6)	(7)	(6–7)	(7)	(6–7)	(5–7)	(6)
Sternal	9	8	7+	9	8	8–9	8–9
Chevron bones	17+	24	17+	20+	27	21–27	24
(fused)		(1–2)			(1–2)		
Sternum							
Sternebrae	3	3	2+	3	3	3	3
(fused)	(0)	(1–3)	(0)	(0)	(1–3)	(1–2:1–3)	(1–2)
Phalangeal formula (including metacarpals)							
I	2	2	2–3	2	2	2–3	3
II	8	7–8	8	7	7	8–10	9
III	6–7	6	6	6	6	7–8	8
IV	3–4	4	4	3	4	3–5	4
V	2	3	2	2	2	2–3	2
Carpal bones	4–5	4	4	4	4	4	4
Epiphyseal ankylosis	1–7, all caudal unfused	complete	1–4, all caudal unfused	1–3, 66–68	complete	4 (all stages)	4 (no obs.)

around numbers 27 to 30; the bilateral breadth of the transverse processes is at its greatest (231–239 mm) around vertebrae 21 to 24, and dwindles to zero around vertebra 55; and the height of the neural canal is at its maximum (42–44 mm) around vertebrae 12 and 13, the canal finally disappearing on the fifty-ninth vertebra.

Other features of the vertebral column also agree with those described by Yamada (1954) and figured by Nishiwaki *et al.* (1965). The neural spines slope backwards as far as vertebra 30 or 31, and are directed forwards thereafter (pl. 7). Zygapophyses are strongly developed from the last cervical vertebra through the next ten vertebrae but by vertebrae 20 to 21 remain only as a single trace on the posterior base of the neural spine. Slight bumps about mid-way along the transverse process of vertebra 9 or 10 indicate the first suggestion of metapophyses, though these are only clearly developed for the first time on vertebra 11 or 12. These processes gradually approach each other and ascend vertically as far as the base of the neural spine. Metapophyses are still present as definite processes as far back as vertebra 26, but by vertebra 30 or 31 have virtually disappeared. The transverse processes, anteriorly directed as far as the thirteenth or fourteenth vertebra, thereafter slope backwards as far as about vertebra 33, where they are approximately straight transverse. Posterior to this the processes are directed in an anterior direction. Specimen 2 lacks an uncinate process on the transverse process of the seventh thoracic vertebra whereas specimen 5 has this character, first described by Yamada (1954). Vertically perforating foramina first appear on vertebra 47 or 48 and continue as far back as the penultimate vertebra. The chevron bones are also illustrated in plate 7.

The form of the sternum, sternal and vertebral ribs and pelvic bones are shown in plate 8, and seem to differ little from those figured and described by previous authors. The sternum of both specimens 2 and 5, however, lacks the deep median cleft in the anterior edge of the manubrium figured by Yamada (1954). Its total median length is 230 and 241 mm respectively, with a maximum breadth of 103 and 102 mm. The longest vertebral rib (fifth) measures 462 mm along its visceral border and is 13 mm wide at its mid-length in specimen 2, and in specimen 5 it (the sixth rib in this instance) is 465 mm long by 13 mm wide. Of the sternal ribs, the second most posterior pair are the longest, measuring 171 mm in specimen 2 and 177 mm in specimen 5, whereas the most anterior are the thickest, measuring 20 and 19 mm respectively at their mid-length.

The hyoid bones (pl. 8) closely resemble the sketch and proportions given by Nishiwaki *et al.* (1965). The maximum span across the thyrohyals is 158 and 155 mm in specimens 2 and 5 respectively, and the overall depth from posterior tip of the thyrohyal to the level of the anterior edge of the basihyal is 111 and 109 mm respectively.

The scapulae (pl. 9) are much as sketched by Nishiwaki *et al.*, being roughly triangular in shape with a straight-line overall length of 230–232 mm in both specimens and a maximum breadth of 171–176 mm. The caudal angle is quite prominent, and the irregular, rough elevations and impressions in both surfaces as well as the uneven thickness of the blade remarked upon by Yamada (1954) are present. The acromion appears to be more expanded at its tip, however, than in the Taiji specimen.

The phalangeal formula has already been described in table 4, and an X-ray photograph of the flipper of specimen number 2 is given in plate 9 to illustrate the general arrangement of bones in the fore-limb. Although four carpal bones appear to be general in *Feresa* (corresponding to the scaphoid, lunar, cuneiform and trapezoid, there being no hamate – Yamada, 1954), it is interesting to note that a fifth carpal bone was found in one flipper of specimen number 1 and probably lost from the other owing to decomposition. This was a small, separate element in contact with the ulna, cuneiform and fifth metacarpal, apparently corresponding to the pisiform.

BEHAVIOUR IN CAPTIVITY

The Sunset Beach animal was washed ashore into a rock pool about twenty yards from a large concrete tidal pool. While awaiting transport to the local zoo it was carried and placed in the tidal pool where it swam amongst several bathers for about an hour. While in the pool, and during handling before and afterwards, the animal never snapped at anyone and was completely placid. This contrasted with the aggressive behaviour to humans displayed by the Hawaiian specimen (Pryor *et al.*, 1965).

When the whale was placed in a 35,000 gallon tank at the zoo, however, four dusky dolphins, *Lagenorhynchus obscurus*, in the same enclosure became considerably agitated and swam in tight circles at the opposite end of the tank, exhaling explosively. They subsequently avoided all contact with the whale when possible until the animal became very weak. The whale did not seem actively aggressive towards the dolphins, but on the morning of 3 January the smallest dolphin (a male 4 feet 10½ inches long) was found dead, bearing long, raking tooth-marks on both sides of the body, on the caudal peduncle and at the base of the flipper. None of these cuts perforated the blubber. The spacing of the tooth-marks clearly indicated that the *Feresa* was responsible. Subsequently a male dolphin in the tank (5 feet 11¼ inches long) was also seen to bear similar tooth-marks on its sides.

This aggressive behaviour towards other cetacean species was also seen in the Hawaiian specimen (a male), which killed a young pilot whale and chased a dolphin round the tank (Pryor *et al.*, 1965). Such behaviour contrasts strangely with that of the killer whale *Orcinus orca*, which in the wild preys on other cetaceans but which to date in captivity has displayed little or no aggression towards dolphins housed with it (Burgess, 1968; Hewlett & Newman, 1968).

The Sunset Beach whale never accepted food despite injections of vitamin B12 complex, and died after six days. At necropsy its first two stomachs were found to be exceptionally heavily parasitised with nematodes, and the fore-stomach bore seven ulcers, the largest of which was about 3·5 cm in diameter.

SUMMARY

Five specimens of *Feresa attenuata* that stranded in Lüderitz lagoon, South West Africa, one specimen that stranded at Richard's Bay, Natal, during 1968, and one specimen that stranded at Sunset Beach, Cape Town, in 1970, were the first of these animals to be recorded from the southern hemisphere since the skull described in 1874 whose origin was given as 'South Seas'. Furthermore, the species had never been recorded before from the Indian ocean. No differences of taxonomic importance could be found between these animals and those previously described from other regions. The Sunset Beach animal attacked two dolphins in captivity, killing one.

ACKNOWLEDGEMENTS

I am indebted to Miss H. Kazmaier of the Lüderitz Museum for first bringing the stranding to my attention, and particularly to Herr W. Eberlanz, also of the Lüderitz Museum, for his co-operation in preserving all five specimens and his generosity in donating three of them to the South African Museum. I am also indebted to Mr. John Bass of the Oceanographic Research Institute, Durban, for the photographs and measurements pertaining to the Richard's Bay specimen.

Mr. Sidney X. Kannemeyer kindly undertook the preparation and photography of the skeletons.

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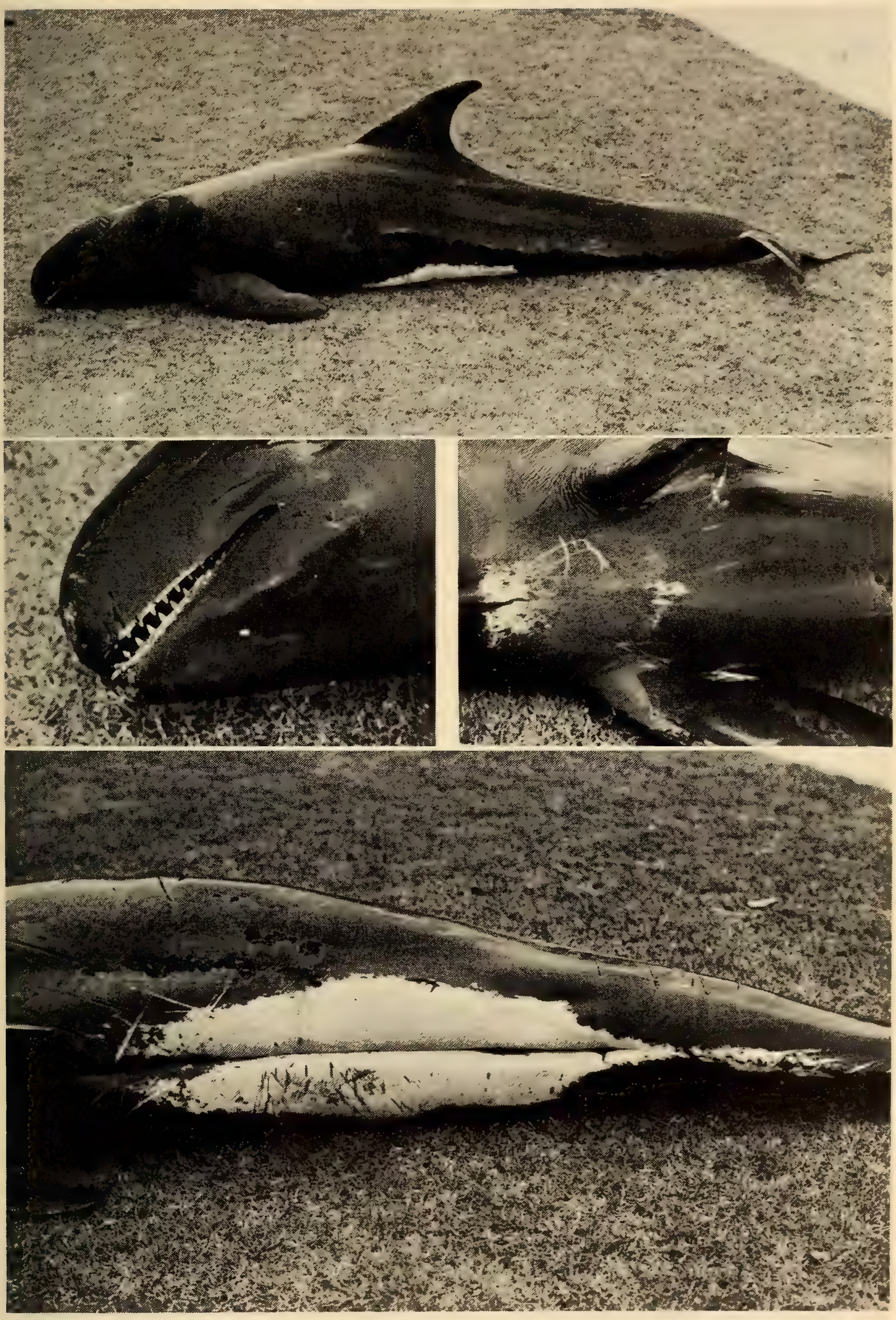
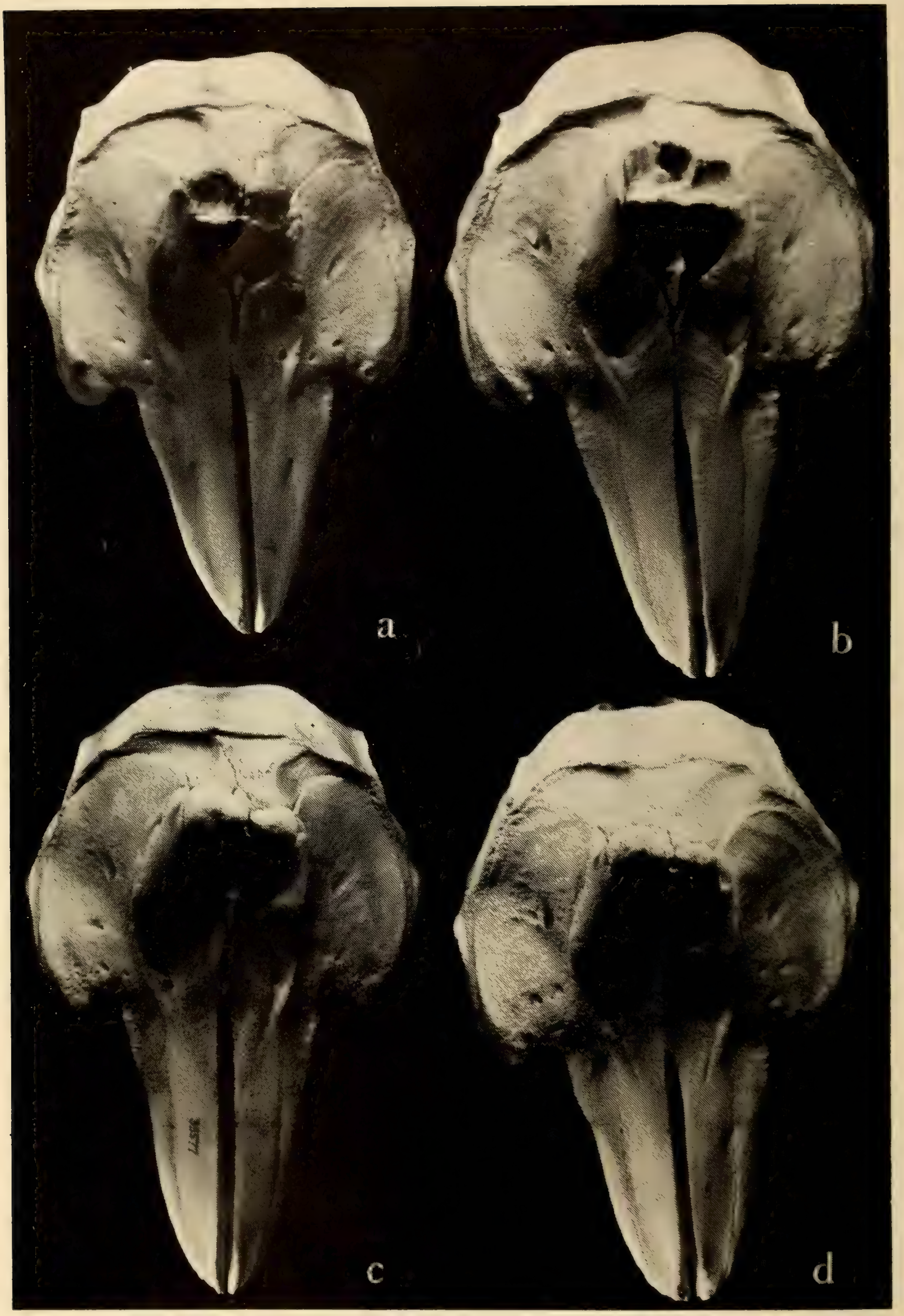
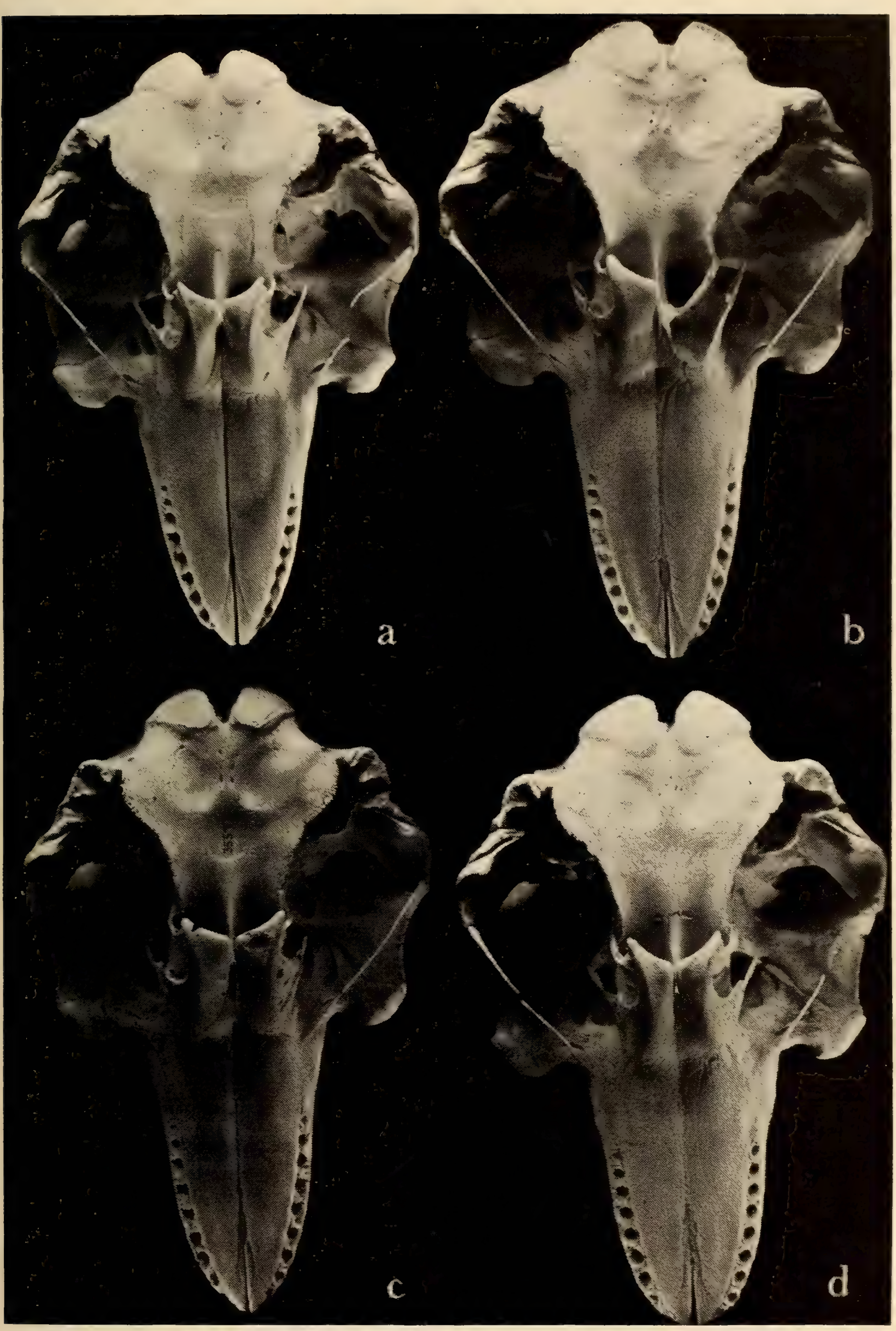


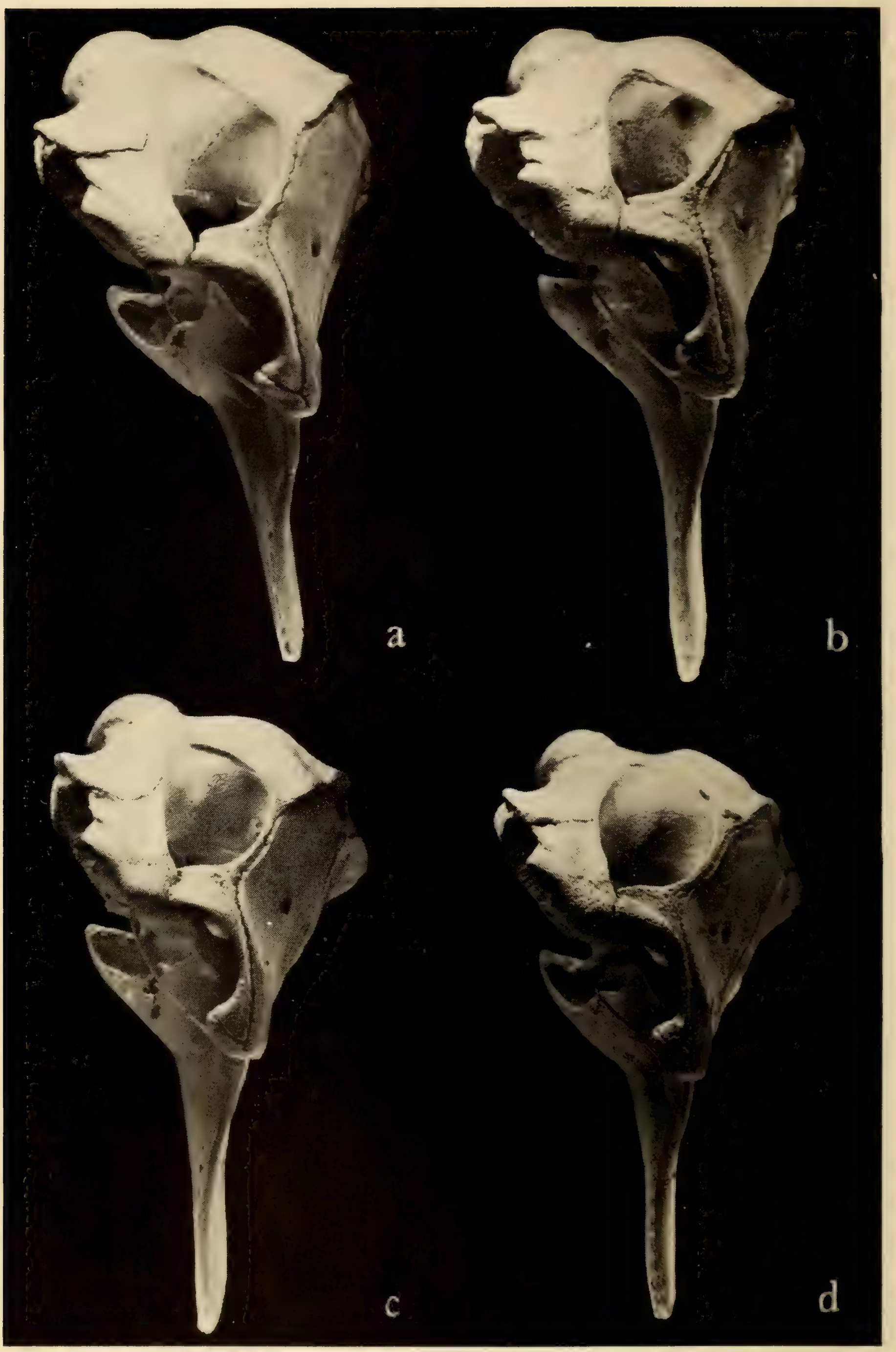
Photographs of Sunset Beach specimen.



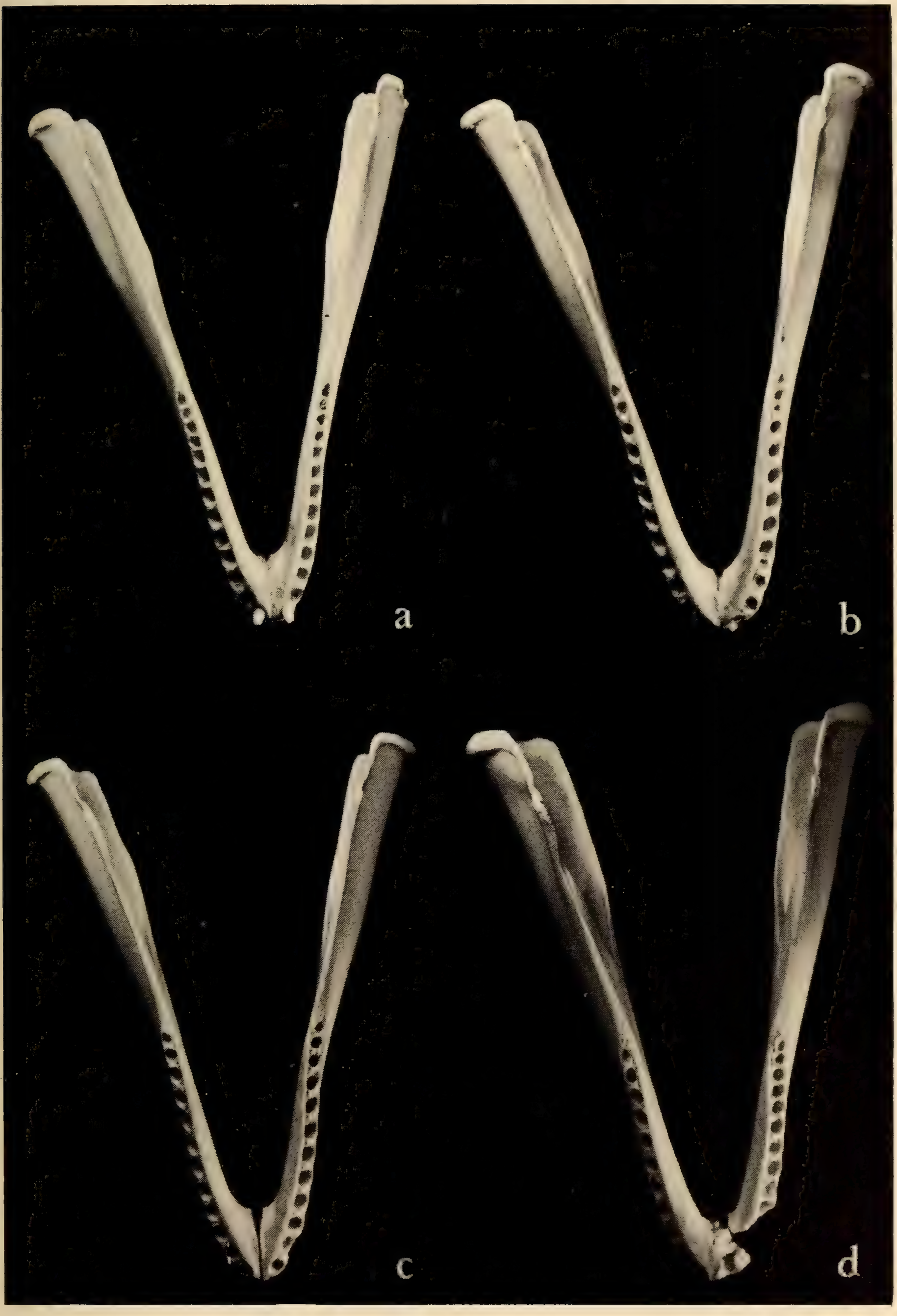
Dorsal view of skulls of specimens 1(a), 2(b), 3(c) and 5(d).



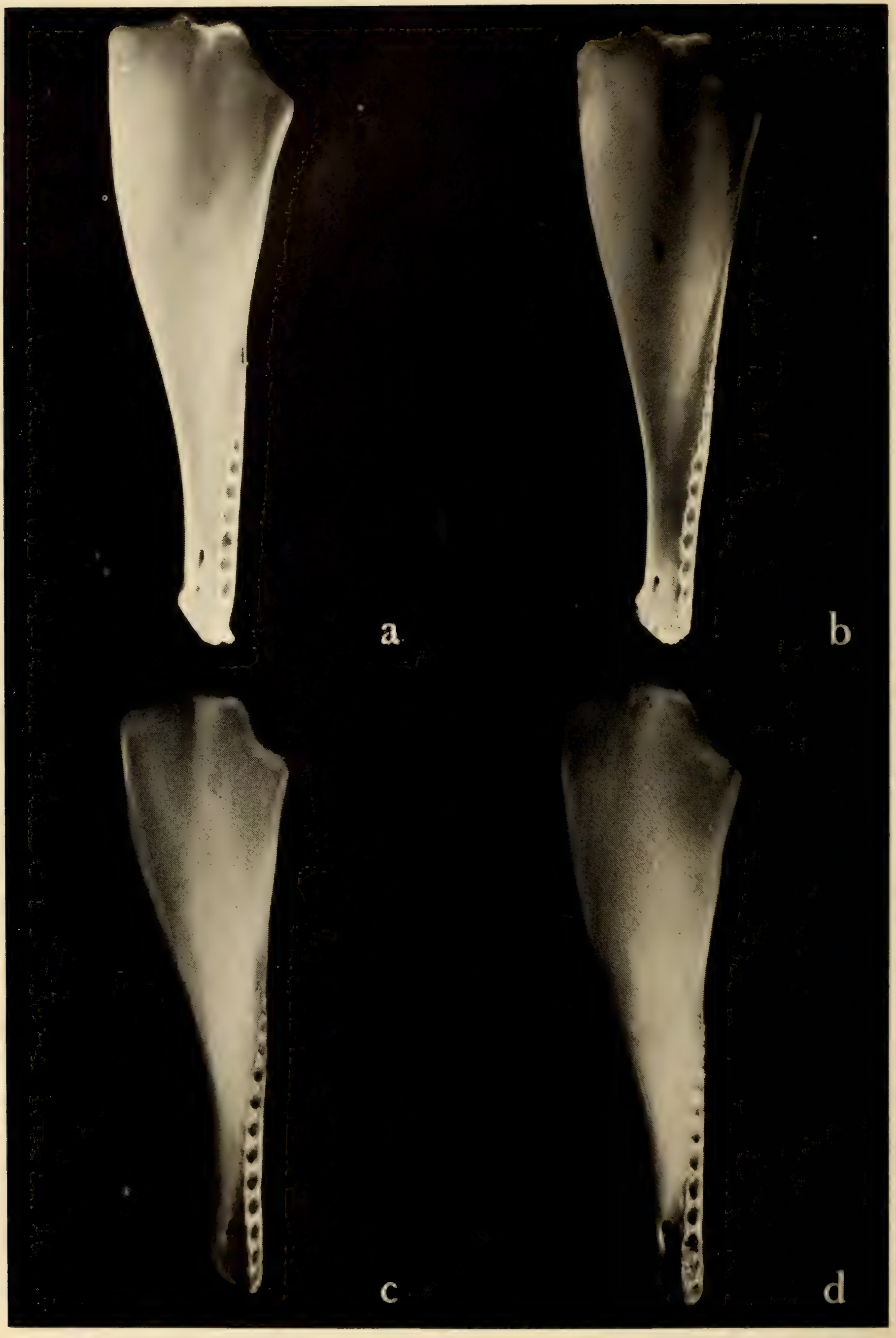
Ventral view of skulls of specimens 1(a), 2(b), 3(c) and 5(d).



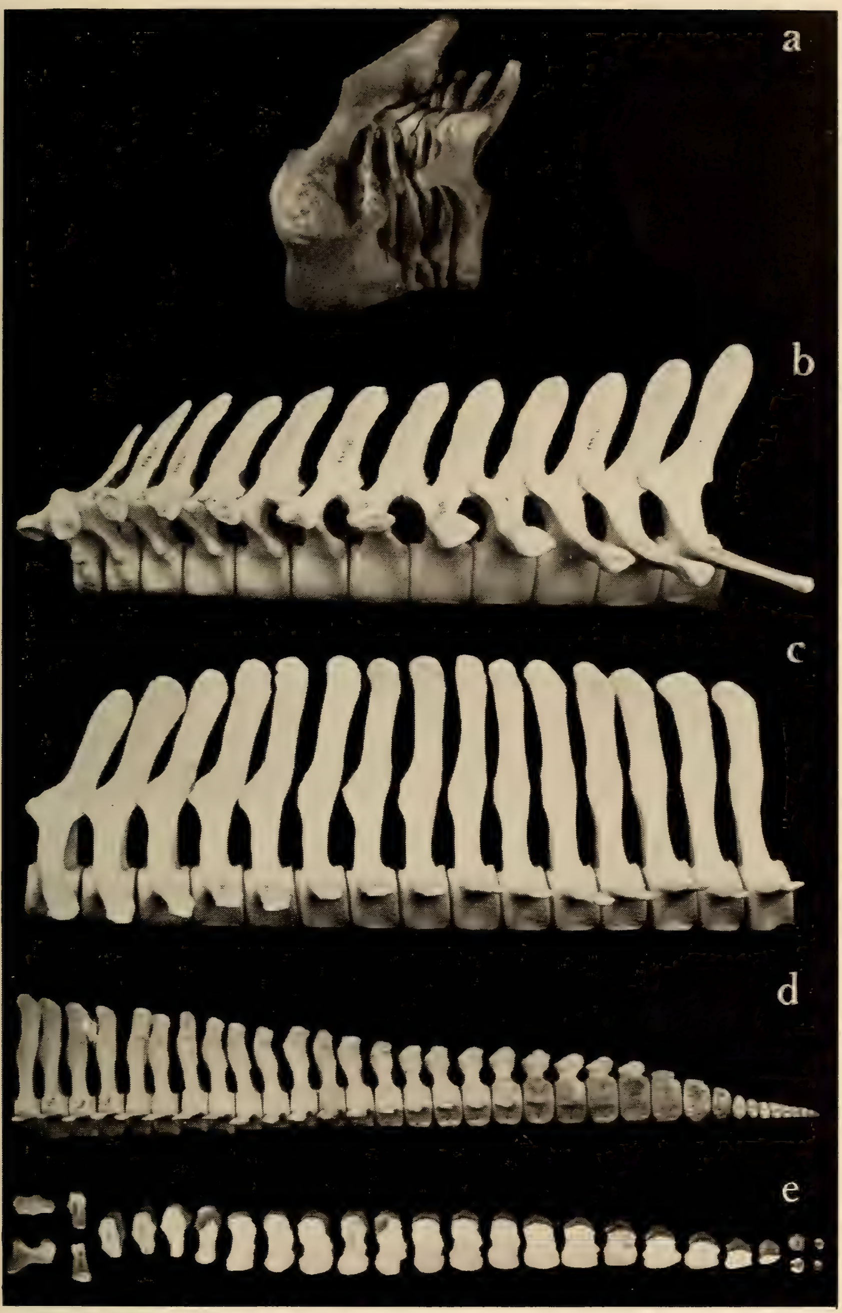
Lateral view of skulls of specimens 1(a), 2(b), 3(c) and 5(d).



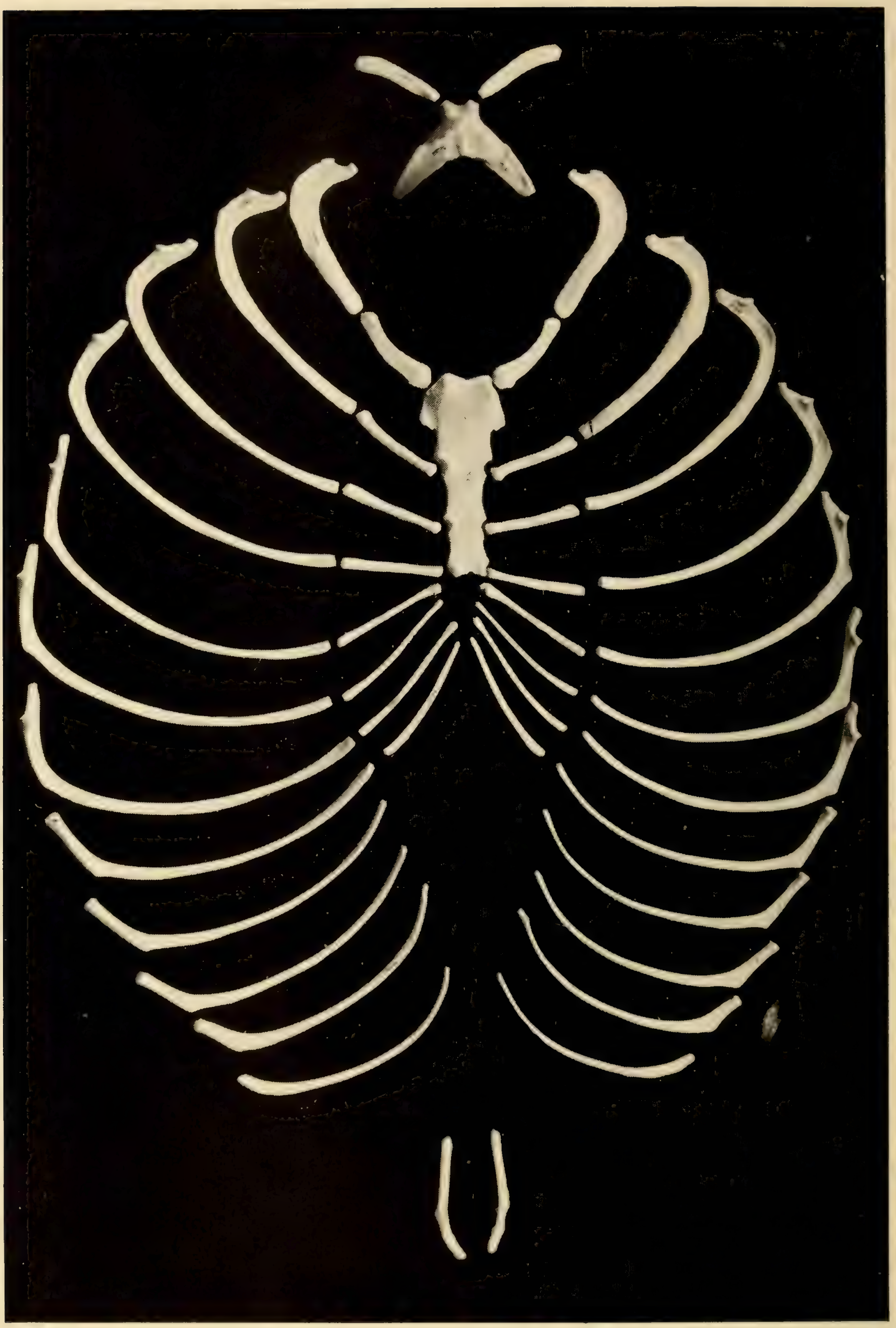
Dorsal view of mandibles of specimens 1(a), 2(b), 3(c) and 5(d).



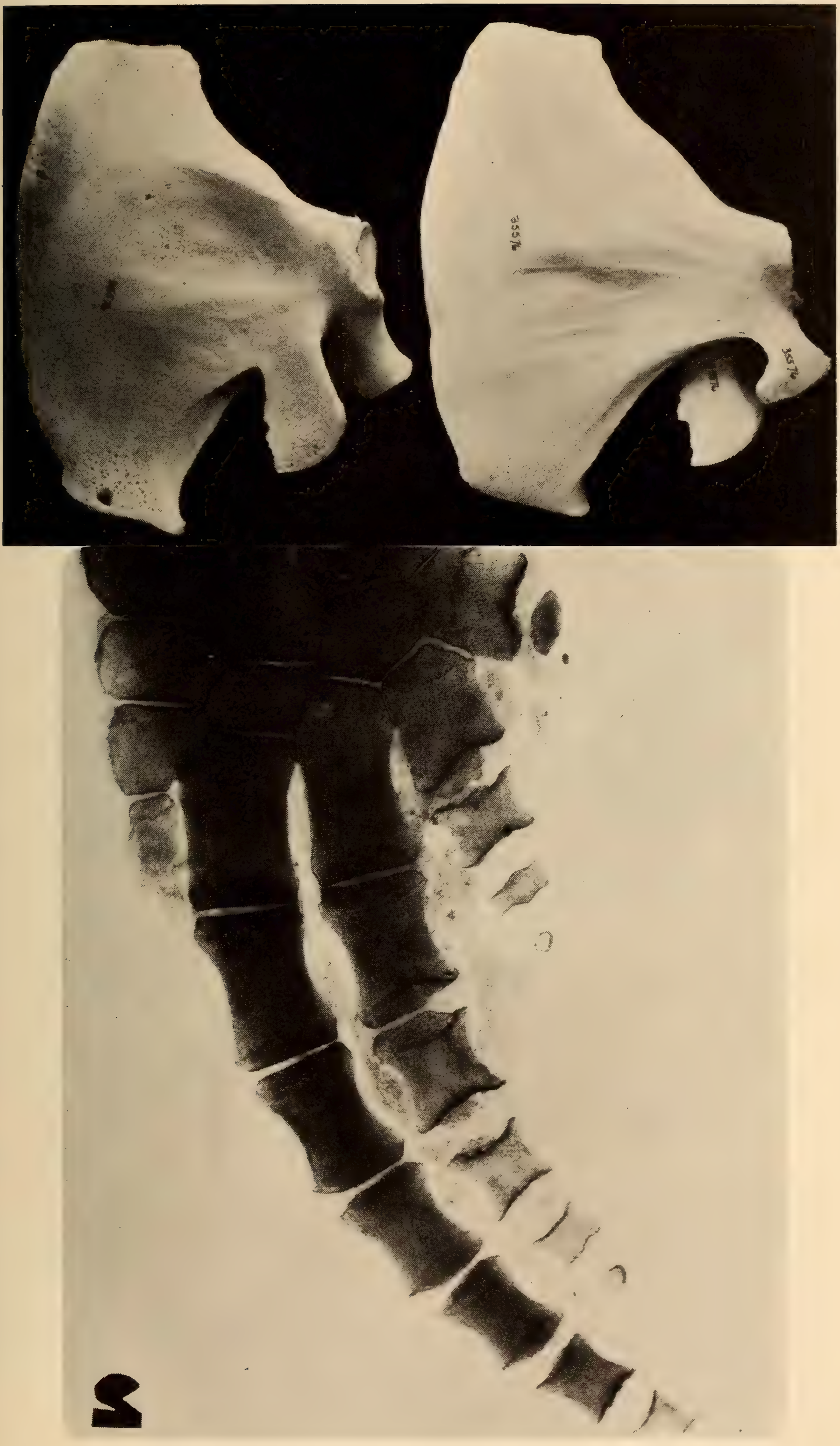
Lateral view of mandibles of specimens 1(a), 2(b), 3(c) and 5(d).



Lateral view of cervical (a), thoracic (b), lumbar (c) and caudal vertebrae (d), and chevron bones (e)—specimen 2.



Sternum, sternal and vertebral ribs, hyoid and pelvic bones—specimen 2.



Scapulae and X-ray photograph of flipper—specimen 2.

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By

BRIAN KENSLEY and MARY-LOUISE PENRITH

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(With 5 figures)

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Introduction

During expeditions of the State Museum, Windhoek, accompanied on two occasions by staff members of the South African Museum, to the northern coast of South West Africa in 1968 and 1969, material was collected which indicated an interesting mytilid fauna. Prior to these expeditions, the intertidal fauna of the South West African coast north of Swakopmund (22°40′S, 14°34′E) was completely unknown. Collecting was carried out at several localities (table 1 and figure 1). The following species of Mytilidae were collected:

	Localities
Aulacomya magellanica (Chemnitz)	Torra Bay; Möwe Bay; Rocky Point
Choromytilus meridionalis (Krauss)	Möwe Bay
Gregariella simplicifilis Barnard	Honolulu; Torra Bay; Möwe Bay; Rocky Point; 4–5 miles south of Kunene R. mouth
Modiolus carvalhoi Klappenbach	Möwe Bay; Rocky Point; 4–5 miles south of Kunene R. mouth
Perna perna (Linnaeus)	Toscanini; Honolulu; Torra Bay; 42 miles north of Unjab R. mouth; Möwe Bay; Rocky Point; Angra Fria; 4–5 miles south of Kunene R. mouth
Semimytilus algosus (Gould)	Toscanini; 42 miles north of Unjab R. mouth; Möwe Bay; Rocky Point; Cape Frio; Angra Fria

Ann. S. Afr. Mus. **57** (2), 1970: 15–24, 5 figs.

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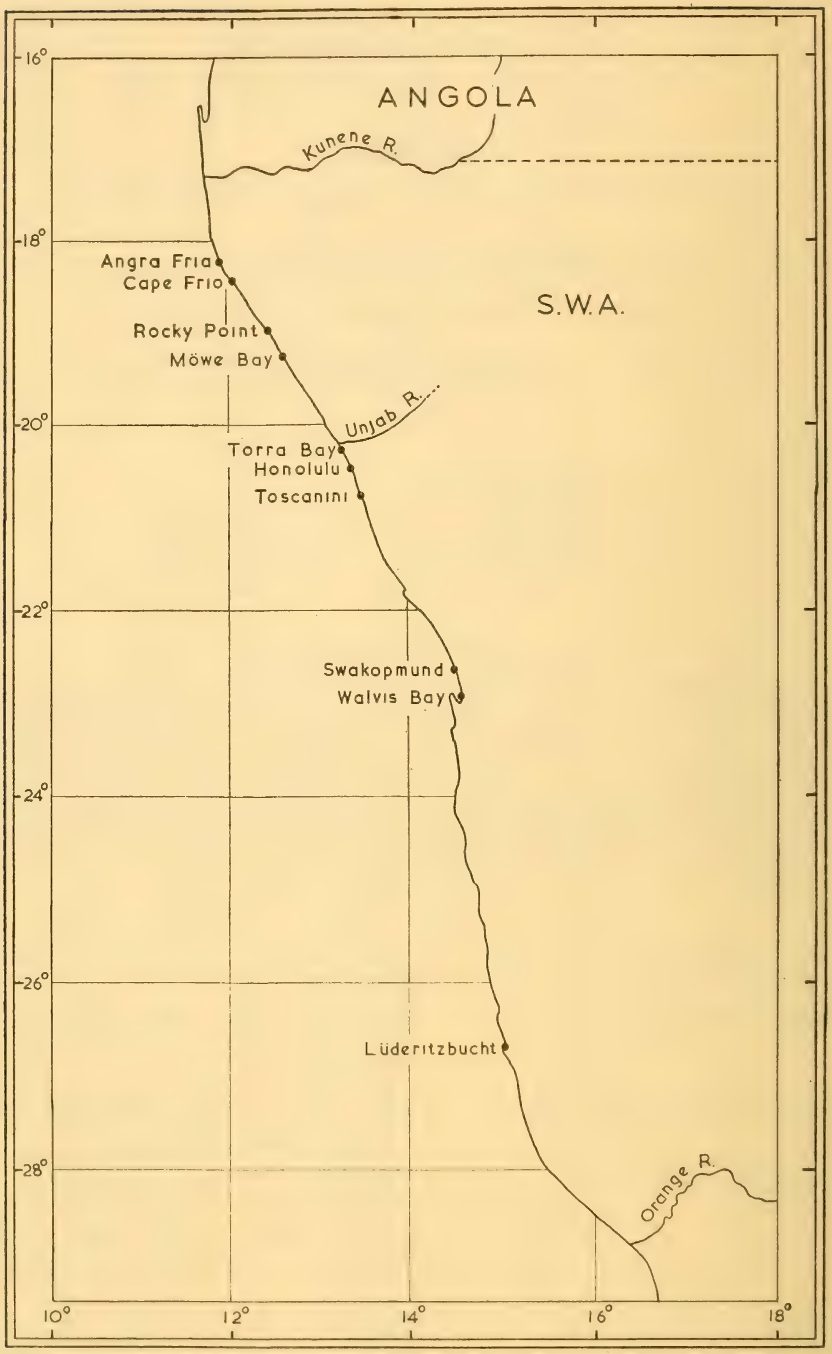

FIG. 1. Map of South West Africa showing localities where collections were made.

The distribution of the common species of Mytilidae on the South West African coast indicates a difference in fauna between the southern and northern areas. The common Mytilidae of the southern South West African coast at least as far north as Lüderitzbucht (26°38′S, 15°10′E) are the same as those of the western Cape coast, i.e. *Choromytilus meridionalis* and *Aulacomya magellanica* (Penrith & Kensley, in press). These are replaced from the region of Walvis Bay (22°59′S, 14°31′E) northwards by *Perna perna*. There is some overlap. *Choromytilus meridionalis* has been recorded from Walvis Bay (Lamy, 1931, see Barnard, 1964), and a single small specimen (8·3 mm) was collected from a kelp holdfast at Möwe Bay in June 1969. *Aulacomya magellanica* was found in very small numbers as far north as Rocky Point; the specimens were very small (6·1–27·8 mm), the average size reached on the southern coast being over 60 mm. Barnard (1964) recorded *Perna perna* as occurring rarely at Lüderitzbucht. *Perna perna* is abundant from Swakopmund northwards, and reaches a large size, specimens of over 100 mm being common.

The occurrence on the northern South West African coast of the three species of Mytilidae discussed below is but one indication of the extremely interesting nature of the fauna of that area. Two of them are otherwise known only from the Pacific coast of South America, and one was recently described from the southern Cape Province to Natal.

NOTES ON SPECIES

Semimytilus algosus (Gould, 1850)

(Figs 2, 3, 4)

Mytilus algosus Gould, 1850: 344.

Semimytilus algosus: Soot-Ryen, 1955: 25, pl. 4, fig. 17, text-figs 8, 9, 14, 15, 16 (synonymy); 1959: 25.

Material

Catalogue No.	*Size range (mm)*	*Locality*	*Date*
S.A.M. A31302	1·2–38·5	Rocky Point	13–16 June 1969
S.A.M. A31303, S.M. M256	1·0–12·4	Möwe Bay	30 May–3 June 1969
S.A.M. A31294, S.M. M253	1·0–22·8	Angra Fria	29 September 1968
S.A.M. A31301, S.M. M254	0·9–18·9	Cape Frio	29 September 1968
S.A.M. A31295, S.M. M255	0·9–14·9	Rocky Point	7 October 1968
S.A.M. A31300, S.M. M258	2·9–10·0	Toscanini	10 November 1968
S.A.M. A31296, S.M. M257	3·0– 9·0	42 miles N. Unjab R.M.	8 November 1968

TABLE 1. Localities where collecting was carried out 1968/69

Toscanini	20°51′S, 13°25′E
Honolulu	20°36′S, 13°18′E
Torra Bay	20°18′S, 13°15′E
42 miles north of Unjab R. mouth	19°44′S, 12°54′E
Möwe Bay	19°20′S, 12°43′E
Rocky Point	18°59′S, 12°29′E
Cape Frio	18°26′S, 12°00′E
Angra Fria	18°17′S, 11°57′E
4–5 miles south of Kunene R. mouth	17°15′S, 11°45′E

TABLE 2. Decrease in number of hinge teeth with increase in length of *Semimytilus algosus*

Shell length (mm)	*No. of hinge teeth*	*Mean no.*	*No. of specimens*
1·0–4·0	16–23	18·9	10
4·1–5·0	11–22	15·9	10
5·1–6·0	9–20	14·3	10
6·1–7·0	3–16	8·3	12
7·1–8·0	3–10	6·3	14
8·1–9·0	2–13	5·9	8
9·1–10·0	0–7	3·6	7
10·1–12·0	0–5	1·0	7
12·1–38·5	0	0·0	8

Remarks

Barnard (1964) mentioned specimens of Mytilidae in the collection of the South African Museum collected by the University of Cape Town at Cape Cross (21°45′S, 13°37′E) in South West Africa that fitted the definition of the monospecific genus *Semimytilus* by Soot-Ryen (1955). These specimens were later identified by Dr. Soot-Ryen as *Semimytilus algosus* (Mr. P. A. Hulley, personal communication), known from the Pacific coast of South America (Ecuador; Chile; Juan Fernandez Islands) (Soot-Ryen, 1955). In South West Africa this species appears to be confined to the northern part of the coast, the southernmost record being Swakopmund (South African Museum); it is common at most localities between Swakopmund and Angra Fria. Small specimens are abundant amongst coralline algae and kelp holdfasts, and the byssus threads of large *Perna perna*.

The numerous small specimens collected show slight variation in shell shape and marginal crenulation. However, all the specimens examined, from the very smallest, show the division of the anterior byssus retractor muscle into two parts (fig. 2), a feature characteristic of *Semimytilus*. All the specimens showing this feature have therefore been assigned to *Semimytilus algosus*.

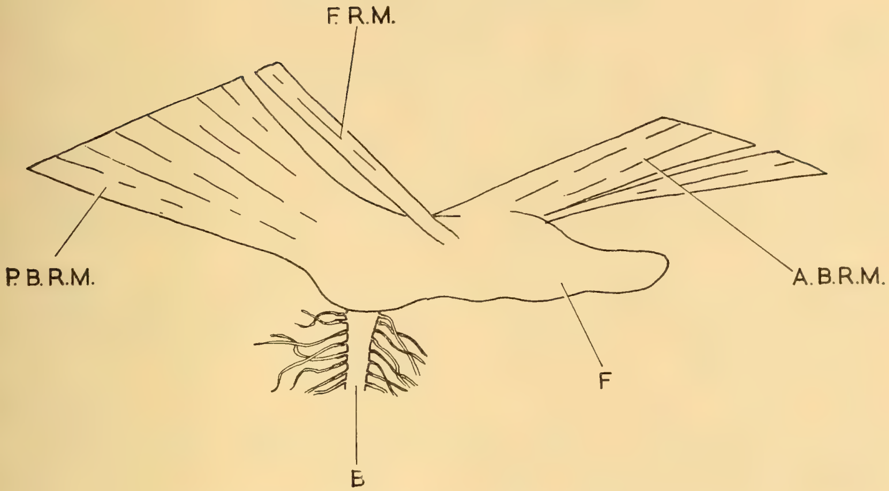

FIG. 2. Byssus musculature of a 2.0 mm *Semimytilus algosus.*

A.B.R.M. — Anterior Byssus Retractor Muscle
B. — Byssus
F. — Foot
F.R.M. — Foot Retractor Muscle
P.B.R.M. — Posterior Byssus Retractor Muscle

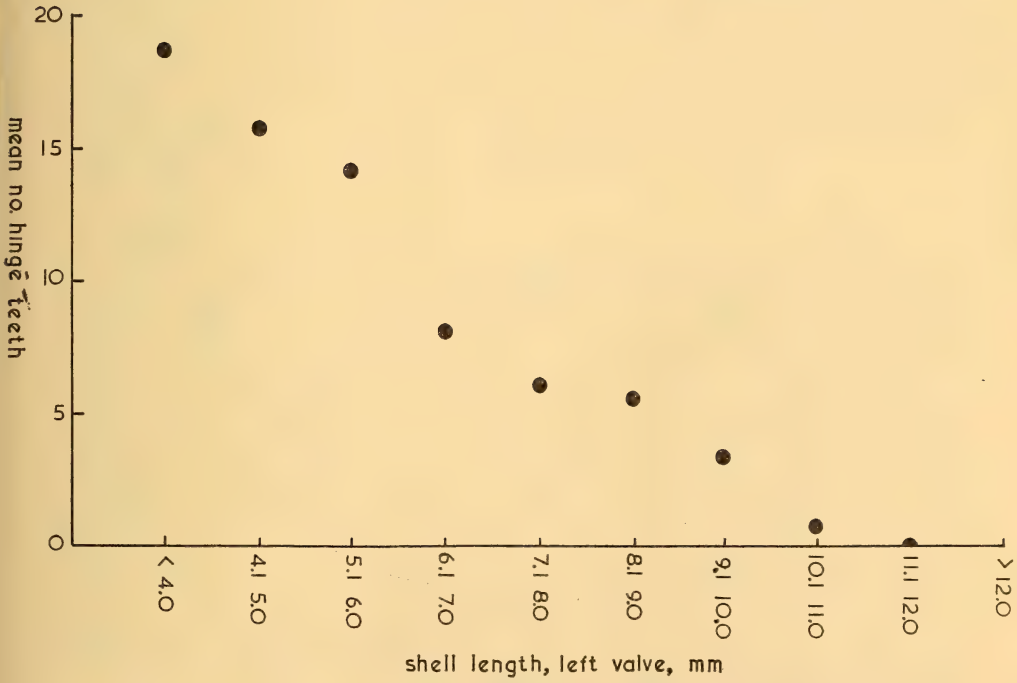

FIG. 3. Mean number of hinge teeth at different shell lengths in *Semimytilus algosus.*

Soot-Ryen (1959) showed that *Semimytilus algosus* does vary somewhat in shape with growth. Barnard (1964) stated that *Semimytilus* lacks hinge teeth, although this character is not included in the original diagnosis of the genus by Soot-Ryen (1955), and there are also no teeth on the anterior margin (Soot-Ryen, 1955). In the present samples, small specimens were found to have 1–3 teeth on the anterior margin up to a shell length of about 3·5 mm; no anterior teeth were found in any specimens from 4·0 mm upwards. Furthermore, small specimens were found to have teeth behind the ligament along the hinge line, but specimens of 12 mm or more had no teeth along the hinge. It was noted that in general the smallest specimens had the most teeth. Measurements and tooth counts were made on a number of specimens of different sizes, and they are shown in table 2 and figure 3. Although there was considerable individual variation, some specimens retaining numerous teeth at a much greater size than others, there was a strongly-marked tendency to reduce the number of teeth with size. This reduction is apparently caused by the teeth being progressively overlain with nacre during growth. The hinge line at different stages is illustrated in figure 4.

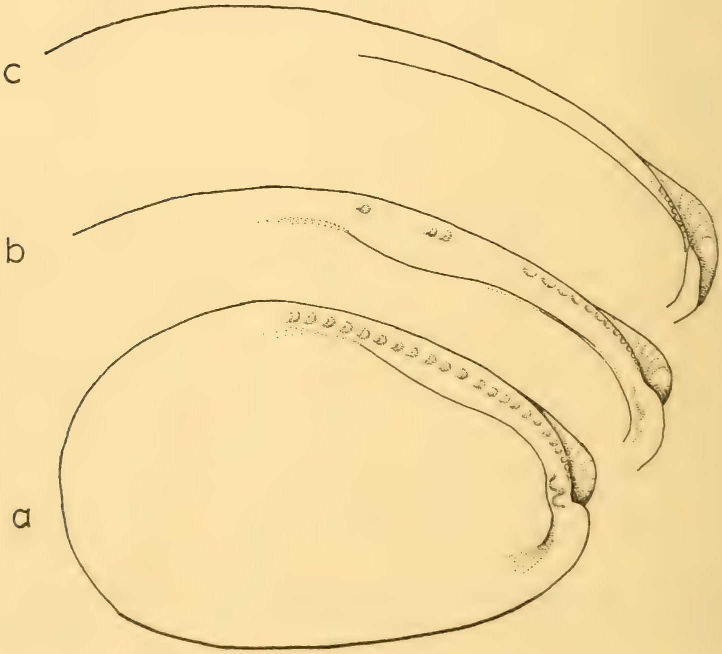

Fig. 4. Hinge line at different stages of development of *Semimytilus algosus*: a. 2.1 mm; b. 7.0 mm; c. 10.6 mm.

Modiolus carvalhoi Klappenbach, 1966

(Fig. 5)

Modiolus carvalhoi Klappenbach, 1966: 251, figs 1–5, 7, 8.

Material

Catalogue No.	*Size range (mm)*	*Locality*	*Date*
S.A.M. A31306, S.M. M250	9·2–13·9	4–5 miles south of Kunene R. mouth	3–4 October 1968
S.A.M. A31299, S.M. M251	2·9–10·3	Rocky Point	13–15 June 1969
S.A.M. A31304, S.M. M252	3·0–19·3	Möwe Bay	30 May–3 June 1969

Description

Shell elongate, inflated. Dorsal margin shallowly convex, ending slightly behind umbo. Umbo subterminal. Lunule rather indistinct. Antero-dorsal angle about 50°, postero-dorsal angle broadly obtuse. Posterior margin smoothly rounded. Ventral margin straight. Anterior margin very short, convex, barely extending beyond umbo. Hinge without teeth. Inner surface nacreous, muscle scars and pallial line indistinct. Postero-dorsal region internally purplish. Shell externally covered by a thin, moderately shiny cuticle, light brown above to yellowish below; dorsal margin dark brown; a dark brown ray radiating from just behind umbo to posterior margin. Entire shell except antero-ventral region covered with a thick periostracum produced into numerous serrate hairs. A very slight carina from umbo to postero-ventral margin, becoming obsolete posteriorly. Sculpture consisting of irregular concentric growth lines. Ligament occupies about two-thirds dorsal margin. Byssus opening elongate and extremely narrow. Byssus threads moderately long, silky.

Remarks

The South West African specimens agree well with descriptions and figures of both *Modiolus carvalhoi*, from Brazil, and *Modiolus capax* (Conrad, 1837), from the Pacific coast of South America. Both these species are distinguished from the other species of *Modiolus* by the serrate periostracal hairs. The periostracal hairs of the South West African specimens appear somewhat broader, with broader processes, than those figured for Pacific specimens of *Modiolus capax* by Soot-Ryen (1955). The hairs of *Modiolus carvalhoi* from Brazil are also broader, in general, but those of the South West African specimens do not resemble Klappenbach's (1966) figures for that species very closely either. In his description of *Modiolus capax*, Soot-Ryen (1955) stated the breadth of the periostracal hairs to be a variable feature, and this certainly seems to be the case in *Modiolus carvalhoi* from Brazil (Klappenbach, 1966, figures 3–5) and in the South West African specimens (fig. 5b).

Modiolus carvalhoi is further distinguished from *Modiolus capax* by the position of the umbones and by its smaller size. In both these characters the

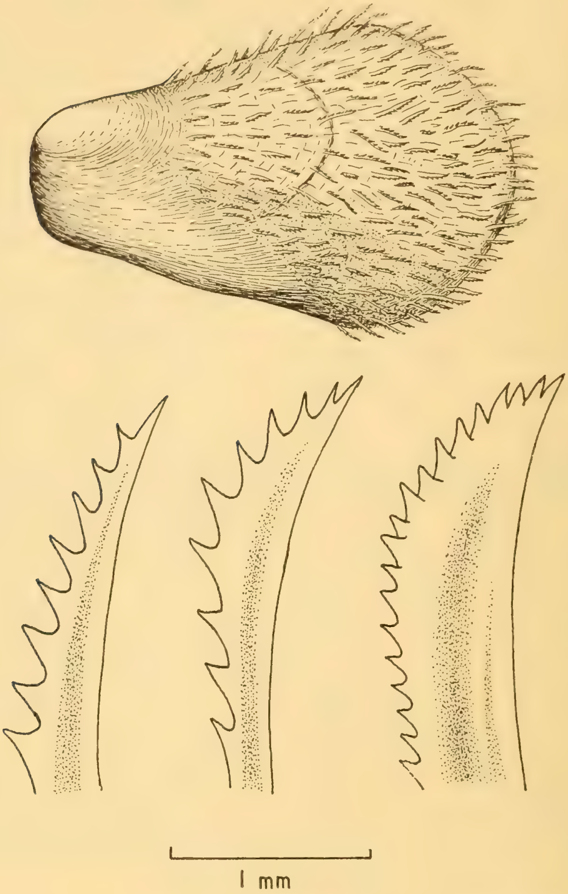

Fig. 5. *Modiolus carvalhoi*, with periostracal hairs further enlarged below.

South West African specimens resemble *Modiolus carvalhoi*, and they are therefore assigned to that species. However, *Modiolus capax* and *Modiolus carvalhoi* are so similar, and the South West African specimens could so easily be assigned to either, that the placing of the South West African specimens presented some difficulty. The fact that *Modiolus carvalhoi* is geographically nearer to South West Africa than *Modiolus capax* has perhaps had undue influence on our decision. However, two intertidal species otherwise known only from the western American coast have been recorded from South West Africa. One of these is the species discussed above, *Semimytilus algosus*; the other is a brachiopod *Discinisca tenuis* (Sowerby), found in large numbers on the South West African coast from Lüderitzbucht to the Kunene river mouth, and otherwise known only from the coasts of Chile and Peru (Dr. H. M. Muir-Wood, *in litt.*).

On the South West African coast *Modiolus carvalhoi* is strongly cryptic, and occurs intertidally in the bases of algal clumps and in kelp holdfasts.

Gregariella simplicifilis Barnard, 1964

Barnard (1964) gave this name to the common species of *Gregariella* in South African waters in order to clear up the considerable confusion which had previously surrounded its identity (see Barnard, 1964: 402 for synonymy).

Material

Catalogue No.	*Size range (mm)*	*Locality*	*Date*
S.A.M. A31209	6·6	4–5 miles south of Kunene R. mouth	3, 4 October 1968
S.A.M. A31210, S.M. M259	4·3, 7·2	Honolulu	9 November 1968
S.A.M. A31297	3·6–6·8	Möwe Bay	31 May, 3 June 1969
S.A.M. A31298	7·0	Rocky Point	15 June 1969
S.A.M. A31305	9·7	Torra Bay	29 May 1969

Remarks

Barnard (1964) gave the distribution of this species as St. James, Cape Peninsula (34°07′S, 18°28′E) to Amanzimtoti, Natal (30°04′S, 30°52′E). It has not been recorded from the South African coast west of the Cape Peninsula. The South West African specimens are identical with the South African specimens in the South African Museum collection. The apparent absence of this species from the coast between the Cape Peninsula and the northern South West African coast may be due to the low water temperatures caused by the Benguela upwelling system in that area. However, as this species is strongly cryptic, occurring in the bases of algal clumps, its absence from the cold-water area may be only apparent.

DISCUSSION

The replacement of *Aulacomya magellanica* and *Choromytilus meridionalis*, the common mytilids of the southern part of the west coast of southern Africa, by *Perna perna* is almost certainly related to inshore water temperatures. The west coast of southern Africa is subject to the influence of the cold Benguela upwelling system, and Lüderitzbucht is situated within the area of maximal effect of this system (Hart & Currie, 1960; Stander, 1964). The distribution of *Perna perna*, a widely distributed species which also gradually replaces *Aulacomya magellanica* and *Choromytilus meridionalis* in the warmer waters east of Cape Point, is evidently interrupted by the low temperatures which prevail along the west coast. *Aulacomya magellanica* is a species found in southern cool temperate seas (South America, the Falkland Islands, Kerguelen Island), and *Choromytilus meridionalis* is apparently endemic to the South African region; both these species are common on the west coast between Lüderitzbucht and Cape Point. North of Lüderitzbucht inshore temperatures rise (Stander, 1964), and the cold-water fauna is gradually replaced by a tropical one.

One of the six species of mytilids recorded from the northern coast of South West Africa, *Semimytilus algosus*, is otherwise known only from the northern South American Pacific coast. Conditions on the two coasts are parallel in that a cold current or upwelling system flows along both, causing temperate conditions to extend well into tropical latitudes. It is nevertheless surprising to find representatives of the same species so widely separated yet apparently undifferentiated in any way.

Summary

Six species of Mytilidae are recorded from the northern coast of South West Africa.

Acknowledgements

We are grateful to the South West African Administration and in particular Mr. C. G. Coetzee, Director of the State Museum, Windhoek, for making the expeditions possible, and to the directors of the Sarusas Development Company for assistance and accommodation at Möwe Bay. We are also indebted to Mr. Coetzee for collecting much of the material. We wish to thank Mr. P. A. Hulley, of the South African Museum, for information regarding *Semimytilus algosus*, and Dr. T. Soot-Ryen, of Norway, for commenting on the manuscript.

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FISCHER, P.-H. 1948. Données sur la résistance et de le vitalité des mollusques. *J. Conch., Paris* **88**: 100–140.

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By

R. I. DICK

Cape Town Kaapstad

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HYPERIIDEA (CRUSTACEA: AMPHIPODA) KEYS TO SOUTH AFRICAN GENERA AND SPECIES, AND A DISTRIBUTION LIST

By

R. I. Dick

*C.S.I.R. Oceanographic Research Unit, University of Cape Town**

(With 16 figures)

[*MS. received* 17 *October* 1969]

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Introduction

It is twenty-nine years since the late Dr. K. H. Barnard published the first comprehensive keys to the South African genera and species of Tanaidacea, Isopoda and Amphipoda. The intervening years have seen, exemplified in the contributions of South Africa to the International Geophysical Year (NGY, 1957–1958) Programme and the International Indian Ocean Expedition (IIOE) as well as the Routine Programmes of the Division of Sea Fisheries, the most intensive sampling of the oceanic marine environment round South Africa that has ever taken place.

A direct result of this was a considerable increase in the volume of zooplankton material available for study, which resulted in a similar increase in the

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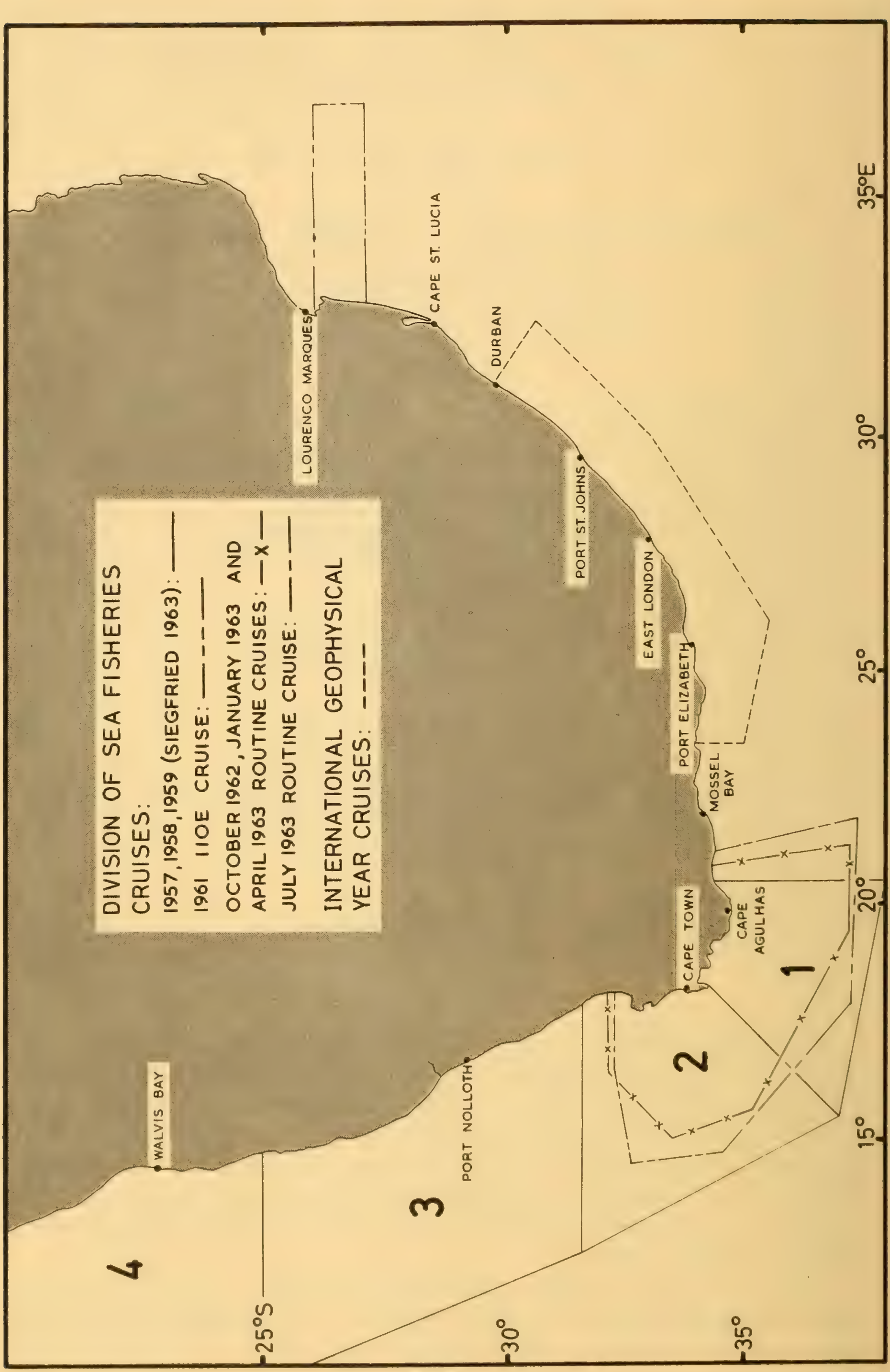

Fig. 1. Areas within South African waters investigated during oceanographic cruises in the years 1957 to 1963.

number of recorded hyperiid amphipod species (of 105 now recorded, 26 are new to South African waters), as well as vastly increased numbers of records for each species. It was for these reasons that a new distribution list and keys to the families, genera and species of South African hyperiid amphipods were compiled.

Material and Methods

The material used by the present author was collected during the International Geophysical Year cruises of S.A.S. *Natal* (hereafter referred to as the NGY cruises), the first SCOR–UNESCO International Indian Ocean Expedition Cruise of R.V. *Africana II* of the Division of Sea Fisheries and the cruises of R.V. *Africana II* and R.V. *Sardinops* made in October 1962, January 1963, April 1963 and July 1963, under the Routine and Extended Routine Programmes of the Division of Sea Fisheries. These cruises contributed 502 samples with hyperiids, which samples yielded approximately 9 000 specimens.

All samples used were obtained using nets of the 'Discovery' pattern, and although nets with mouth apertures of 70 cm, 100 cm and 200 cm were used at various times, most of the material originated from samples collected with the 100 cm net. The latter was hauled horizontally over a depth range of from five metres to the surface and obliquely from 150 metres to the surface.

The South African records for the check list were augmented with data obtained from publications relevant to the area under consideration which was defined as that south of latitude 20° South and up to 320 km from the coast (measured normal to the coast). Where records were rare or scattered over a large area, each was referred to the degree square in which it occurred. The latter was designated in terms of the latitude and longitude co-ordinates of the left upper corner. If records were particularly numerous in a given area or positions were not given for the original stations the distribution of the species was stated in terms of the area(s) in question (this procedure had to be adopted with the data of Siegfried (1963), which only contained position references where species were rare).

In order to gain some idea of the world distribution of the species it was decided to list as many as possible of the records of various authors (designated by numbers indicating the author and the page on which the record occurred). It is not claimed that the list is complete.

As a result of the wide distribution of many hyperiids a great deal of confusion exists in the taxonomy of many species. For this reason, references are given to publications containing the most complete synonymies and/or discussions of these where the degree of confusion merits this. It must be emphasized that the references are not the most recent but rather the most complete in many cases.

In so far as they concern South African records of species, depth ranges of occurrence have only been given where these are 300 metres or less. This limitation was imposed because of the practice of the earlier expeditions of hauling plankton nets through water columns of 1 000 metres and more, thus destroying any depth distinction between epipelagic and mesopelagic forms.

The keys published cannot be claimed to be completely original. Where only minor changes have been made to earlier authors' keys the original authors are acknowledged. In all other cases an attempt has been made to incorporate the observations of the present author. In the keys to the Lanceolidae and Scinidae, species not yet recorded from South Africa have been included and appear in parentheses. This has been done in anticipation of future additions to the fauna, while at the same time obviating the introduction of an unnecessarily artificial character into these keys. The drawings for the keys have, as far as possible, been made from actual specimens using a Zeiss (West Germany) Abbé drawing apparatus mounted on a stereomicroscope. Where this was not possible, the best published drawings were reproduced with acknowledgements.

KEY TO THE FAMILIES OF SOUTH AFRICAN HYPERIID AMPHIPODA

1.	Mandible without palp		2
	Mandible with palp		6
2.	Uropod 2 absent	*Cystisomidae*	(p. 34)
	Uropod 2 present		3
3.	Uropod inner rami fused with peduncles; uropods 1 and 2, outer rami reduced to spines	*Scinidae*	(p. 29)
	Uropod inner rami not fused with peduncles; uropods 1 and 2, outer rami not reduced to spines		4
4.	Pereiopod 3, 5th joint expanded or elongate and variably toothed with 6th and 7th joints folding against it	*Phronimidae*	(p. 36)
	Pereiopod 3, 5th joint unmodified with 6th and 7th joints not folding against it		5
5.	Gnathopod 1, 2nd joint longer than combined length of 3rd to 7th joints	*Paraphronimidae*	(p. 34)
	Gnathopod 1, 2nd joint shorter than combined length of 3rd to 7th joints	*Dairellidae*	(p. 36)
6.	Uropods lack rami	*Phrosinidae*	(p. 38)
	Uropods normal, biramous		7
7.	Pereiopod 4, 3rd joint inserted subterminally on 2nd joint		9
	Pereiopod 4, 3rd joint inserted terminally on 2nd joint		8
8.	Pereiopod 5, all joints present		11
	Pereiopod 5, reduced to 1st and 2nd joints plus rudiments of joints 3 to 7	*Pronoe* (*Pronoidae*)	(p. 39)
9.	Mandibular palp, 2nd joint less than half length of 1st joint	*Pronoidae*	(p. 39)
	Mandibular palp, and joint greater than half length of 1st joint		10
10.	Pereiopod 3, 3rd joint inserted terminally on 2nd joint; pereiopod 5 with all joints usually; flagellum of antenna 2, male, 4th joint half to three-quarters length of 3rd joint	*Parascelidae*	(p. 44)
	Pereiopod 3, 3rd joint inserted in a terminal notch or subterminally on 2nd joint; pereiopod 5 reduced to 1st and 2nd joints plus variable number of rudiments of 3rd to 7th joints; flagellum of antenna 2, male, 3rd and 4th joints subequal	*Platyscelidae*	(p. 44)
11.	Pereiopod 4, 4th joint about twice width of 3rd and 5th joints	*Lycaeopsidae*	(p. 39)
	Pereiopod 4, 4th joint equal in width to 3rd and 5th joints		12
12.	Pereiopods 3 to 5, 7th joint covered by hooded process of 6th joint	*Lanceolidae*	(p. 29)
	Pereiopods 3 to 5, 7th joint not covered by hooded process of 6th joint		13
13.	Flagellum of antenna 1, 1st joint large and more than three times combined length of rest of joints		14

Flagellum of antenna 1, 1st joint small to medium sized and many times shorter than combined length of rest of joints .. .. *Hyperiidae* (p. 34)
14. Flagellum of antenna 1, 1st joint straight with 2nd terminally inserted on it *Vibiliidae* (p. 34)
Flagellum of antenna 1, 1st joint curved with 2nd subterminally inserted on it .. 15
15. Mandibular palp, 2nd and 3rd joints subequal; rostrum present .. *Oxcephalidae* (p. 42)
Mandibular palp, 1st and 3rd joints subequal; rostrum absent 16
16. Inner rami of uropods, not fused with peduncles; gnathopods 1 and 2 chelate *Brachyscelidae* (p. 41)
Inner rami of uropods, one or more pairs fused with peduncles; gnathopods 1 and 2 simple or tending to subchelate .. .. *Lycaeidae* (p. 39)

KEY TO THE GENERA AND SPECIES OF SOUTH AFRICAN LANCEOLIDAE

1. Eyes medium sized; 'reflecting cups' present adjacent to eyes *Scypholanceola vanhoeffeni*
Eyes small; no 'reflecting cups' present .. .. *Lanceola* 2
2. Pereiopod 4 longer than peraeon 3
Pereiopod 4 shorter than peraeon 4
3. Peduncle of uropod 3 longer than telson .. .. *L. serrata*
Peduncle of uropod 3 equal to length of telson .. .. .. *L. pacifica*
4. Pereiopod 2 equal to the combined length of 1st to 5th joints of pereiopod 4 (*L. felina*)
Pereiopod 2 subequal to pereiopod 4 .. .. (*L. clausi*)

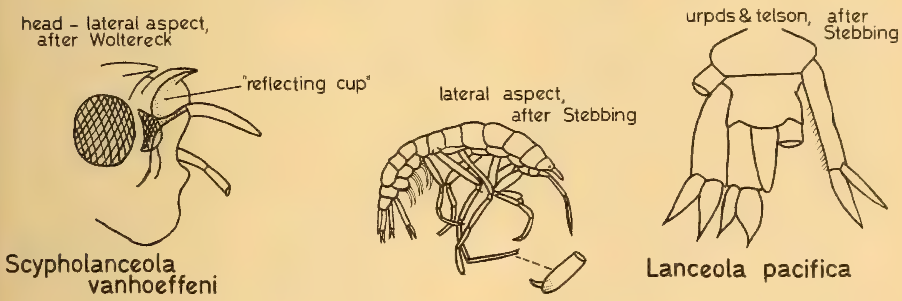

FIG. 2. Family *Lanceolidae*

KEY TO THE GENERA AND SPECIES OF SOUTH AFRICAN SCINIDAE
(modified from Hurley, 1956, after Wagler, 1926)

1. Terga of body segments produced in erect middorsal spines; peraeon segments 1 and 2 free .. .. *Ctenoscina*
9 middorsal spines .. .. *C. brevicaudata*
Terga of body segments without middorsal spines .. .. *Scina* 2
2. All appendages, especially antenna 1, pereiopod 3, and uropods greatly elongated *S. stenopus*
All appendages not greatly elongated 3
3. Gnathopods 1 and 2, 6th joint anteriorly produced beyond insertion of 7th joint; 6th joint of gnathopod 1, posterior margin toothed; 6th joint of gnathopod 2, anterior margin toothed .. .. *S. marginata*
Gnathopods 1 and 2, 6th joint not anteriorly produced beyond insertion of 7th joint 4
4. Pereiopod 3, anterior margin of 2nd joint smooth 5
Pereiopod 3, anterior margin of 2nd joint with at least one distal tooth 8
5. Pereiopod 3, posterior margin of 2nd joint smooth, anterodistal angle of 2nd joint with a strong spine 6

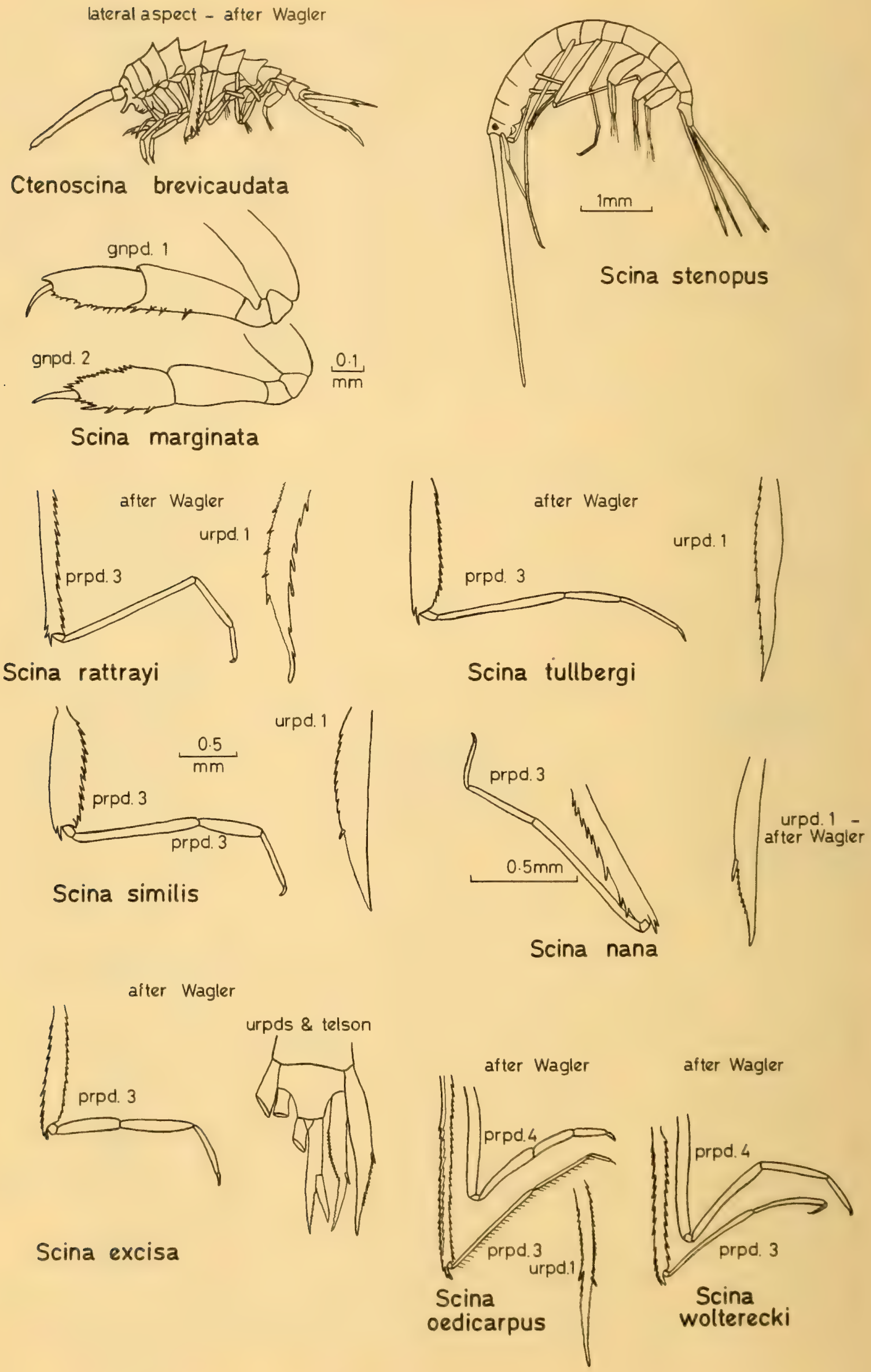

Fig. 3. Family *Scinidae*

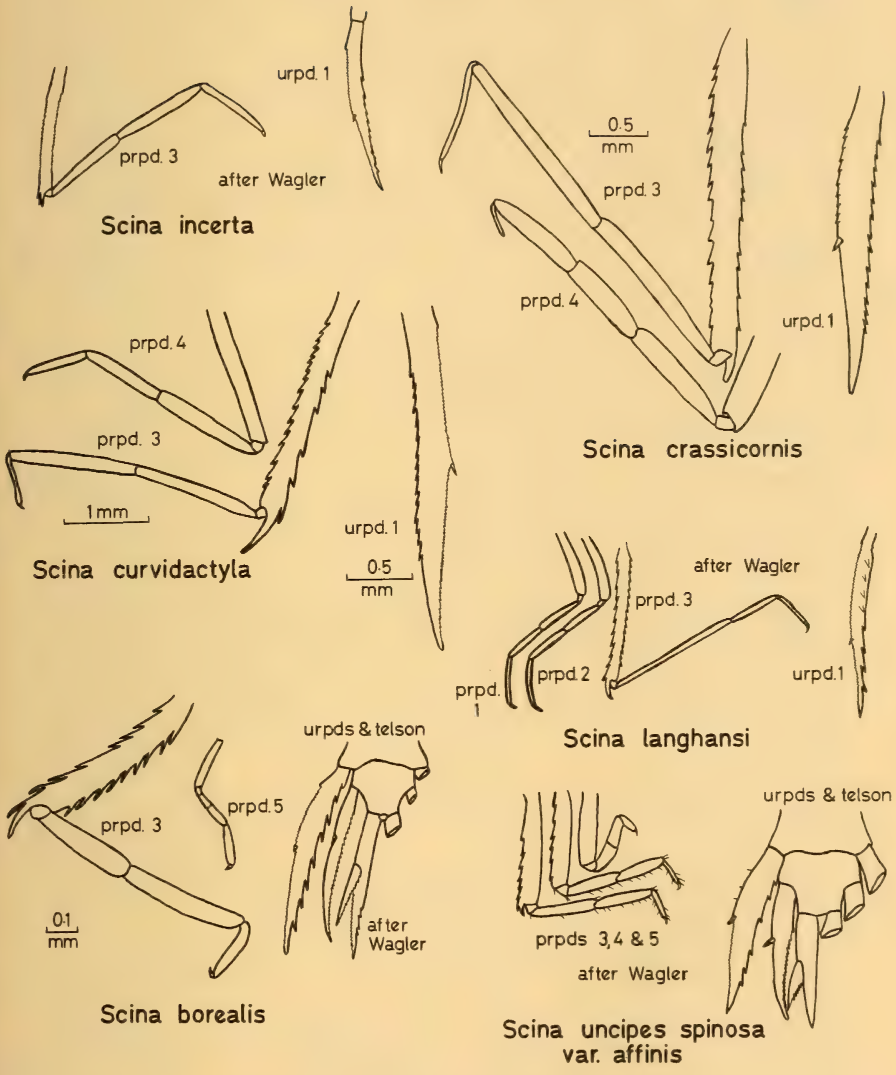

FIG. 3 (*cont.*). Family *Scinidae*

	Pereiopod 3, posterior margin of 2nd joint toothed, anterodistal angle of 2nd joint with a weak spine	7
6.	Pereiopod 3, outer surface of 2nd joint with about 8 teeth	(*S. armauer-hanseni*)
	Pereiopod 3, outer surface of 2nd joint smooth	(*S. stebbingi*)
7.	Uropod 1, inner margin smooth	(*S. latifrons*)
	Uropod 1, inner margin toothed	(*S. inermis*)
8.	Pereiopod 3, anterior margin of 2nd joint only distally toothed	9
	Pereiopod 3, anterior margin of 2nd joint toothed entire length	14
9.	Uropod 1, inner margin smooth	10
	Uropod 1, inner margin toothed	*S. rattrayi*
10.	Outer ramus of uropod 1 very long, about two-thirds length of inner ramus and twice length of outer ramus of uropod 2; pereiopods 3 and 4, 7th joint with a long seta from 6th joint over it	(*S. setigera*)
	Outer ramus of uropod 1 not very long and not longer than outer ramus of uropod 2	11
11.	Second joint of pereiopod 3 equal to combined length of 3rd to 7th joints	(*S. alberti*)
	Second joint of pereiopod 3 not a great deal longer than 4th joint	12
12.	Outer ramus of uropod 1 about one-tenth length of peduncle	*S. similis*
	Outer ramus of uropod 1 about one-sixth length of peduncle	13
13.	Uropod 1, outer margin of peduncle smooth	*S. nana*
	Uropod 1, outer margin of peduncle finely toothed	*S. tullbergi*
14.	Inner margin of uropod 1 smooth	15
	Inner margin of uropod 1 toothed	18
15.	Outer ramus of uropod 1 long, half length of peduncle	(*S. typhlops*)
	Outer ramus of uropod 1 short, one-sixth (or less) length of peduncle	16
16.	Second joint of pereiopod 3, teeth on anterior and posterior margins subequal; telson half length of peduncle of uropod 3	(*S. pusilla*)
	Second joint of pereiopod 3, teeth on anterior margin larger than those on posterior margin; telson less than one-third of length of peduncle of uropod 3	17
17.	Second joint of pereiopod 3 shorter than combined length of 4th and 5th joints; inner ramus of uropod 2 curves inwards	*S. excisa*
	Second joint of pereiopod 3 longer than combined length of 4th and 5th joints; inner ramus of uropod 2 does not curve inwards	(*S. damasii*)
18.	Inner margin of uropod 1 with one large tooth and fine teeth proximal and distal to it	19
	Inner margin or uropod 1 with teeth subequal, fine or coarse	20
19.	Pereiopod 4 subequal in length to pereiopod 3, slender; 7th joint of pereiopod 4 small	*S. woltereckí*
	Pereiopod 4 shorter than combined length of 1st to 4th joints of pereiopod 3; 7th joint of pereiopod 4 about one-third length of 6th joint	*S. oedicarpus*
20.	Inner margin of uropod 1 with usually more than 12 fine teeth	21
	Inner margin of uropod 1 with a maximum of 12 large teeth	24
21.	Antenna 1 longer than peraeon, subequal in length to pereaeon plus pleon; 6th joint of pereiopod 3 shorter than, or subequal in length to 5th joint; 7th joint of pereiopod 3 very short	22
	Antenna 1 subequal in length to peraeon; 6th joint of pereiopod 3 longer than 5th joint; 7th joint of pereiopod 3 half length of 6th joint	(*S. lepisma*)
22.	Sixth joint of pereiopod 3 less than half length of 5th joint	23
	Sixth joint of pereiopod 3 subequal in length to 5th joint	*S. incerta*
23.	Seventh joint of pereiopod 4 almost one-third length of 6th joint; 4th joint of pereiopod 4 subequal in length to 6th joint	*S. crassicornis*
	Seventh joint of pereiopod 4 less than one-eighth length of 6th joint, hook-like; 4th joint of pereiopod 4 twice length of 6th joint	*S. curvidactyla*
24.	Antenna 1 longer than peraeon, subequal in length to peraeon plus pleon	25
	Antenna 1 subequal in length to peraeon	26
25.	Fourth joint of pereiopod 3 three times length of 6th joint; anterodistal angle of 2nd joint of pereiopod 3 with a short smooth spine; pereiopods 1 and 2, 4th joint equal in length to 6th joint	*S. langhansi*

Fourth joint of pereiopod 3 subequal in length to 6th joint; anterodistal angle of 2nd joint of pereiopod 3 with a strong spine toothed on the anterior and posterior margins; pereiopods 1 and 2, 4th joint two-thirds length of 6th joint (*S. vosseleri*)

26. Fourth joint of pereiopod 3 subequal in length to 5th joint; uropod 2, outer margin of peduncle and inner ramus smooth; uropod 3, inner margin of peduncle smooth 27

Fourth joint of pereiopod 3 twice length of 5th joint; uropod 2, outer margin of peduncle and inner ramus finely toothed; uropod 3, inner margin of peduncle with large teeth .. .. (*S. antarctica*)

27. Pereiopod 5 slender, not longer than combined length of 1st to 3rd joints of pereiopod 3 .. .. *S. borealis*

Pereiopod 5 stout, subequal to the combined length of 1st to 4th joints of pereiopod 3 28

28. Pereiopods 3 and 4 are thickly setose .. .. (*S. pubera*)

Pereiopods 3 and 4 have few hairs .. .. .. *S. uncipes spinosa* var. *affinis*

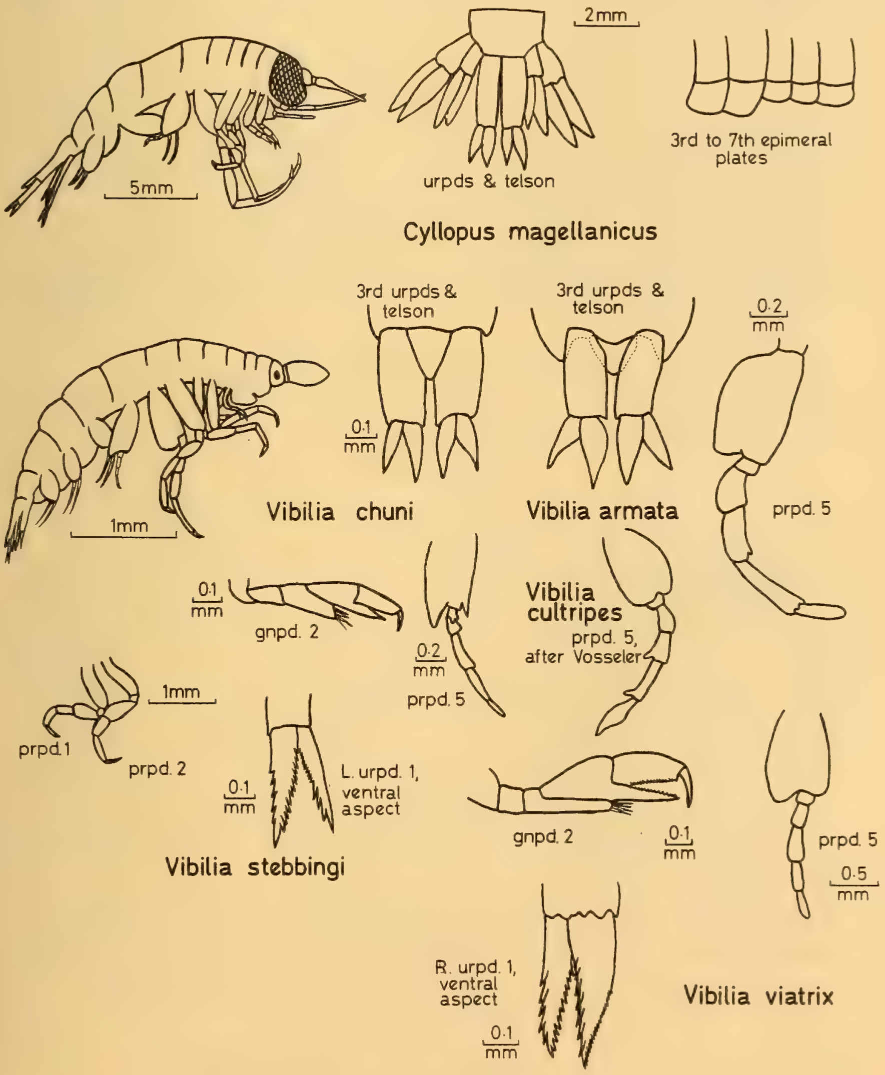

FIG. 4. Family *Vibiliidae*

KEY TO THE GENERA AND SPECIES OF SOUTH AFRICAN VIBILIIDAE

1. Eyes large, occupying whole of head; antenna 2 inserted on inferior surface of head; pereiopods 1 and 2, not longer than combined length of 1st to 5th joints of pereiopods 3 and 4; peduncle of uropod 3 longer than that of uropod 1 (*Cyllopus*); Peraeonal epimeral plates 3 and 4 twice length of 5th to 7th epimeral plates .. .. *C. magellanicus*
   Eyes small to medium sized, not occupying whole of head; antenna 2 inserted on anterior surface of head; pereiopods 1 and 2, longer than combined length of 1st to 5th joints of pereiopods 3 and 4; peduncle of uropod 3 shorter than that of uropod 1 .. .. *Vibilia* 2
2. Posterodistal corners of 3rd urosome segment produced 3
   Posterodistal corners of 3rd urosome segment not produced 5
3. Second joint of pereiopod 5 longer than combined length of 3rd to 7th joints *V. chuni*
   Second joint of pereiopod 5 shorter than, or equal to combined length of 3rd to 7th joints 4
4. Pereiopod 5, anterodistal corners of 5th and 6th joints not obviously produced *V. armata*
   Pereiopod 5, anterodistal corners of 5th and 6th joints obviously produced *V. cultripes*
5. Pereiopods 1 and 2, 4th joint as wide as 3rd and 5th joints .. *V. antarctica*
   Pereiopods 1 and 2, 4th joint wider than 3rd and 5th joints 6
6. Fifth joint of gnathopod 2, produced anteriorly more than half length of 6th joint 7
   Fifth joint of gnathopod 2, produced anteriorly half length of 6th joint *V. propinqua*
7. Second joint of pereiopod 5 with antero- and posterodistal corners obviously produced; uropods 1 and 2, inner side of outer ramus with small teeth proximally and large teeth distally .. .. *V. stebbingi*
   Second joint of pereiopod 5 with antero- and posterodistal corners not obviously produced; uropods 1 and 2, inner side of outer ramus has only small teeth *V. viatrix*

KEY TO THE SPECIES OF SOUTH AFRICAN PARAPHRONIMIDAE

1. Pereiopod 5 not longer than combined length of 1st to 4th joints of pereiopod 4 *Paraphronima gracilis*
   Pereiopod 5 subequal to pereiopod 4 .. .. *P. crassipes*

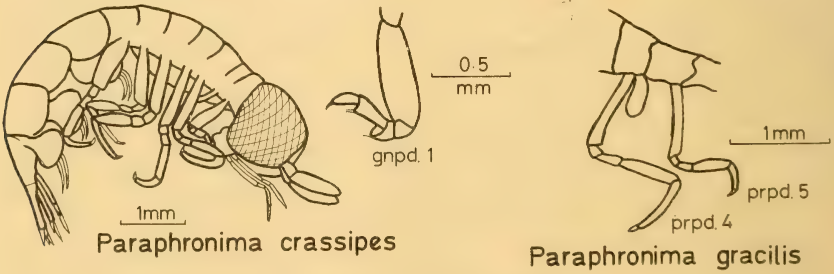

FIG. 5. Family *Paraphronimidae*

FAMILY CYSTISOMIDAE WILLEMOES-SUHM, 1875

In view of the considerable confusion existing in the taxonomy of species of *Cystisoma*, no key is given here.

KEY TO THE GENERA AND SPECIES OF SOUTH AFRICAN HYPERIIDAE

1. Pereiopods 1 to 5, 6th joint distally produced opposite long 7th joint *Phronimopsis spinifera*
   Pereiopods 1 to 5, 6th joint not produced 2

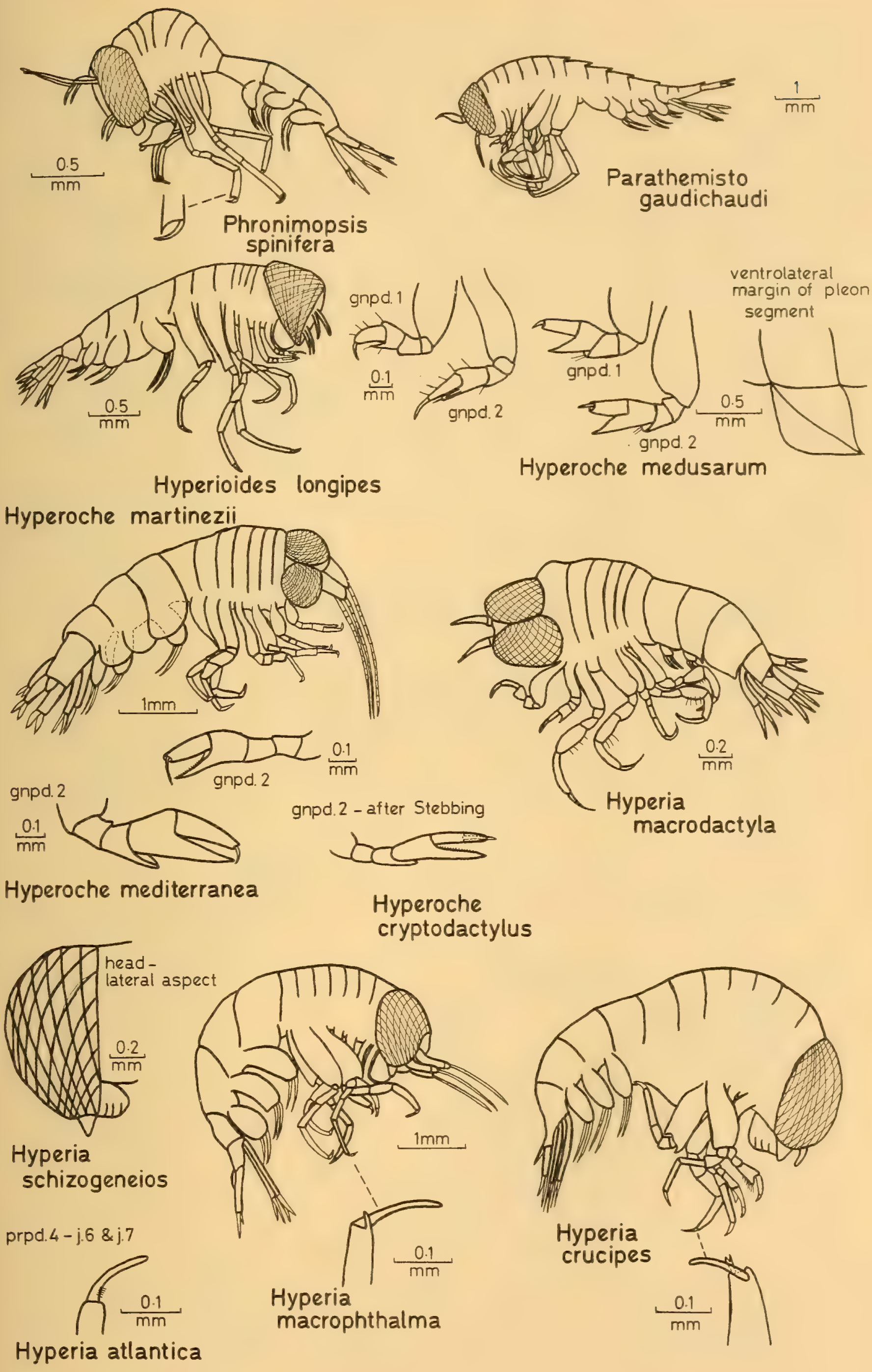

FIG. 6. Family *Hyperiidae*

2. Pereiopods 1 and 2, 5th joint wider than 4th and 6th joints 3
Pereiopods 1 and 2, 5th joint not wider than 4th and 6th joints 4
3. Pereiopods 1 and 2, 7th joint less than half length of 6th joint *Parathemisto gaudichaudi*
Pereiopods 1 and 2, 7th joint subequal to 6th joint .. *Hyperia macrodactyla*
4. Gnathopods 1 and 2, process of 5th joint laterally compressed and always more than half length of 6th joint 5
Gnathopods 1 and 2, process of 5th joint broad and scoop-like and not always more than half length of 6th joint .. .. *Hyperia* 9
5. Dorsal surface of head flattened; gnathopods 1 and 2, anterior edge of process of 5th joint flattened .. .. *Hyperioides longipes*
Dorsal surface of head rounded; gnathopods 1 and 2, anterior edge of process of 5th joint knife-like .. .. *Hyperoche* 6
6. Posterodistal corners of pleon segments produced as small points 7
Posterodistal corners of pleon segments smoothly rounded 8
7. Sixth joint of gnathopod 2 with a hooded process covering two-thirds of 7th joint *Hyperoche cryptodactylus*
Sixth joint of gnathopod 2 with a minor process .. .. *H. medusarum*
8. Posterior margin of 4th joint of gnathopod 2 produced under 5th joint *H. mediterranea*
Posterior margin of 4th joint of gnathopod 2 not produced .. *H. martinezii*
9. Species longer than 10 millimetres .. .. *Hyperia gaudichaudi*
Species maximally 10 millimetres long 10
10. Sides of head with a sharp pointed ventral process reaching level of mouthparts 11
Sides of head with a blunt ventral process not reaching level of mouthparts .. 12
11. Pereiopods 3 to 5, 6th joint with a distal forked spine opposing 7th joint *H. crucipes*
Pereiopods 3 to 5, 6th joint without a distal spine .. .. *H. schizogeneios*
12. Pereiopods 3 to 5, width of 2nd joint greater than half length .. *H. fabrei*
Pereiopods 3 to 5, width of 2nd joint less than half length 13
13. Pereiopod 4, 7th joint with a group of hairs in its crook and 6th joint without a distal spine .. .. *H. atlantica*
Periopod 4, 7th joint without a group of hairs in its crook; 6th joint with a distal spine opposing 7th joint .. .. *H. macrophthalma*

FAMILY DAIRELLIDAE VOSSELER, 1901

Dairella latissima is the only representative of the family.

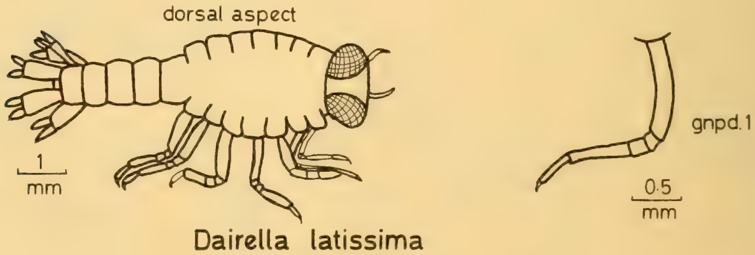

FIG. 7. Family *Dairellidae*

KEY TO THE GENERA AND SPECIES OF SOUTH AFRICAN PHRONIMIDAE

1. All appendages greatly elongate; 5th joint of pereiopod 3 about three times as long as broad, with anterior margin toothed and 6th and 7th joints folding against it *Phronimella elongata*

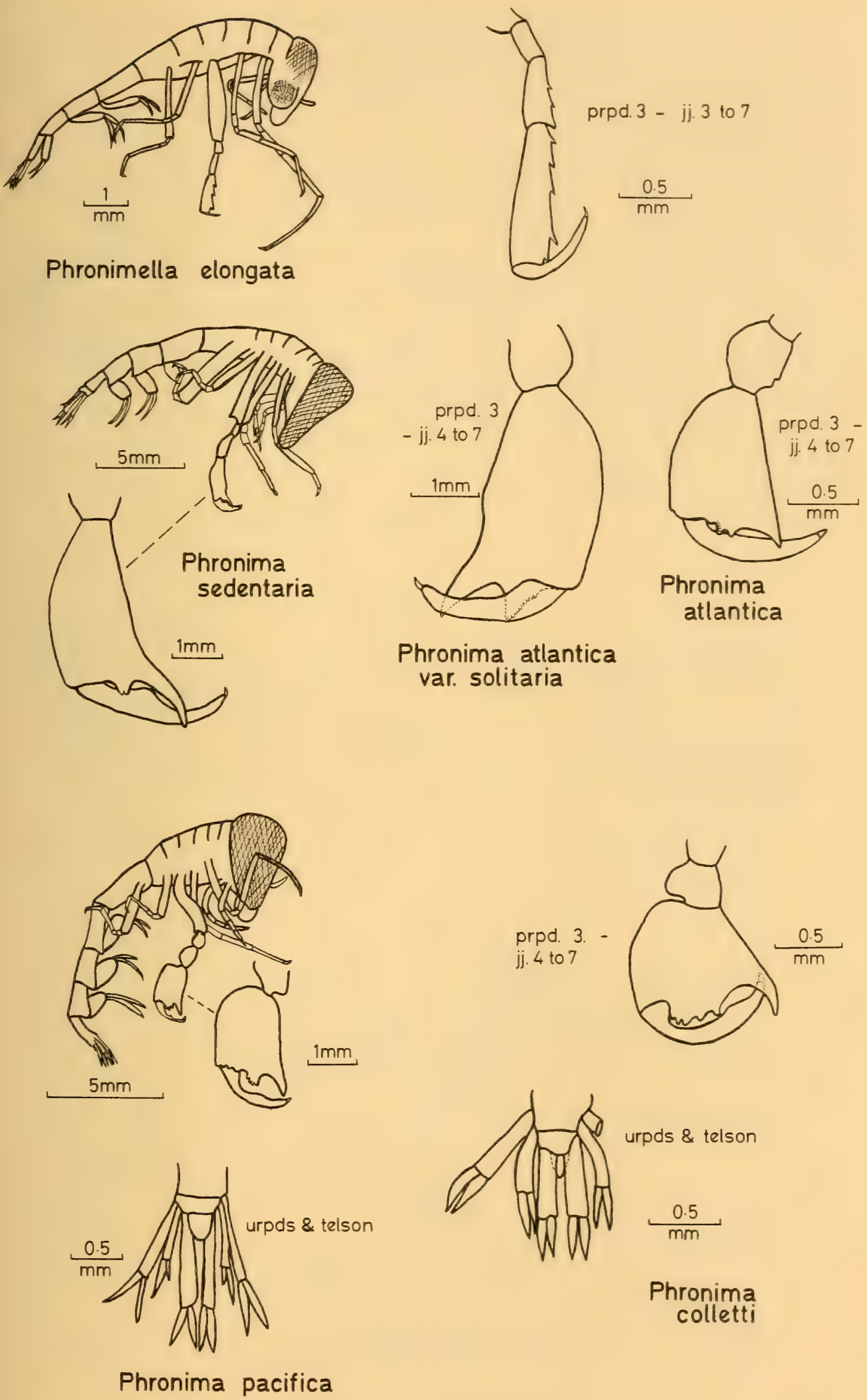

FIG. 8. Family *Phronimidae*

All appendages not greatly elongate; 5th joint of pereiopod 3 distally expanded and toothed, not three times as long as broad . . . . . . *Phronima* 2
2. Sixth joint of pereiopod 3, longer than maximum width of 5th joint 3
Sixth joint of pereiopod 3, as long as maximum width of 5th joint 5
3. Fifth joint of pereiopod 3, anterodistal process more than twice length of tubercle on expanded end . . . . *Phronima sedentaria*
Fifth joint of pereiopod 3, anterodistal process subequal to tubercle on expanded end 4
4. Fifth joint of pereiopod 3, tubercle preceded by a single tooth . . *P. atlantica*
Fifth joint of pereiopod 3, tubercle not preceded by any teeth *P. atlantica* var. *solitaria*
5. Inner ramus of uropod 2, less than half length of outer ramus . . *P. pacifica*
Inner ramus of uropod 2, subequal to outer ramus . . . . *P. colletti*

Key to the Genera and Species of South African Phrosinidae

1. Pereiopods 1 and 2 simple . . . . *Primno macropa*
Pereiopods 1 and 2 prehensile with 6th and 7th joints folding against 5th joint. . 2
2. Fifth joint of pereiopods 1 and 2, with a single pointed process *Anchylomera blossevillei*
Fifth joint of pereiopods 1 and 2, with a multiple toothed process *Phrosina semilunata*

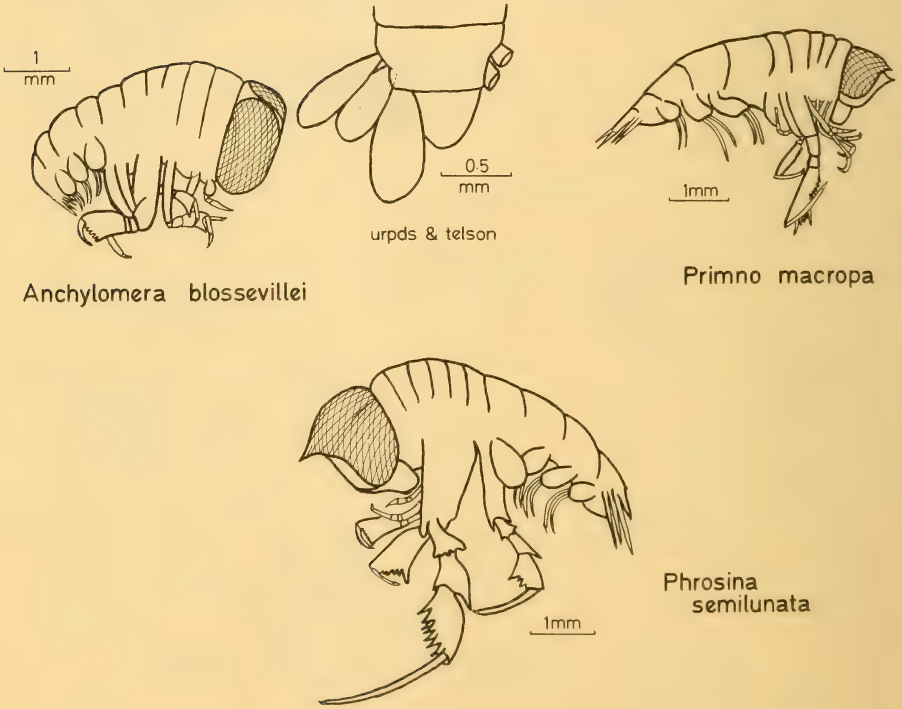

Fig. 9. Family *Phrosinidae*

KEY TO THE SPECIES OF SOUTH AFRICAN LYCAEOPSIDAE

1. Telson more than half as long as uropod 3, apical angle less than 45° *Lycaeopsis zamboangae*
   Telson less than half as long as uropod 3, apical angle greater than 45° *L. themistoides*

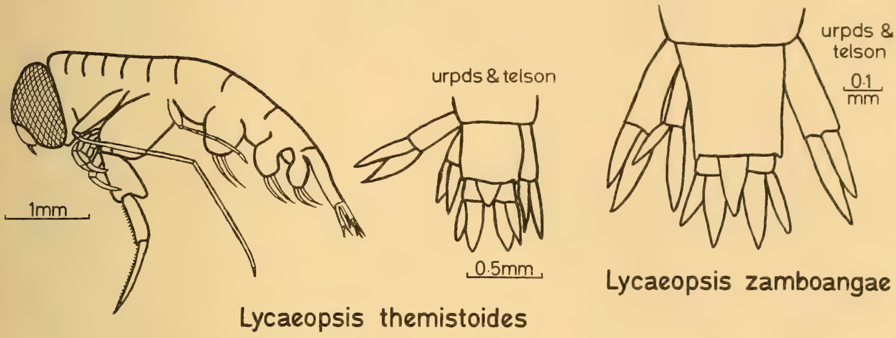

FIG. 10. Family *Lycaeopsidae*

KEY TO THE GENERA AND SPECIES OF SOUTH AFRICAN PRONOIDAE

1. Gnathopods 1 and 2 both simple 2
   Gnathopod 1 subchelate; gnathopod 2 chelate 3
2. Gnathopods 1 and 2 robust; maximum width of pereiopod 5 greater than half length; 2nd joint of pereiopod 5 right-angled where rudiment of 3rd joint is inserted . . . . *Pronoe capito*
   Gnathopods 1 and 2 slender; maximum width of pereiopod 5 less than half length *Paralycaea gracilis*
3. First urosome segment greater than half combined length of 2nd and 3rd urosome segments . . . . *Eupronoe* 4
   First urosome segment less than half combined length of 2nd and 3rd urosome segments 7
4. Fourth joint of gnathopod 1 produced under 5th joint . . *Eupronoe minuta*
   Fourth joint of gnathopod 1 not produced under 5th joint 5
5. Gnathopod 2, posterior margin of process of 5th joint apically rounded *E. laticarpa*
   Gnathopod 2, process of 5th joint apically acute 6
6. Gnathopod 2, anterodistal corner of 5th joint produced . . . . *E. maculata*
   Gnathopod 2, anterodistal corner of 5th joint not produced . . *E. intermedia*
7. Rami of uropod 3 broadly oval . . . . *Sympronoe parva*
   Rami of uropod 3 lanceolate . . . . *Parapronoe crustulum*

KEY TO THE GENERA AND SPECIES OF SOUTH AFRICAN LYCAEIDAE

1. Pereiopods 1 to 4, 6th joint with small distal process to which 7th joint is opposed *Tryphana malmii*
   Pereiopods 1 to 4, 6th joint without a distal process 2
2. Pereiopods 3 and 4 equal in length, with 4th joint wider than 3rd and 5th joints *Pseudolycaea pachypoda*
   Pereiopod 4 as long as combined length of 1st to 5th joints of pereiopod 3; pereiopods 3 and 4 with 4th joint as wide as 3rd and 5th joints *Lycaea* 3

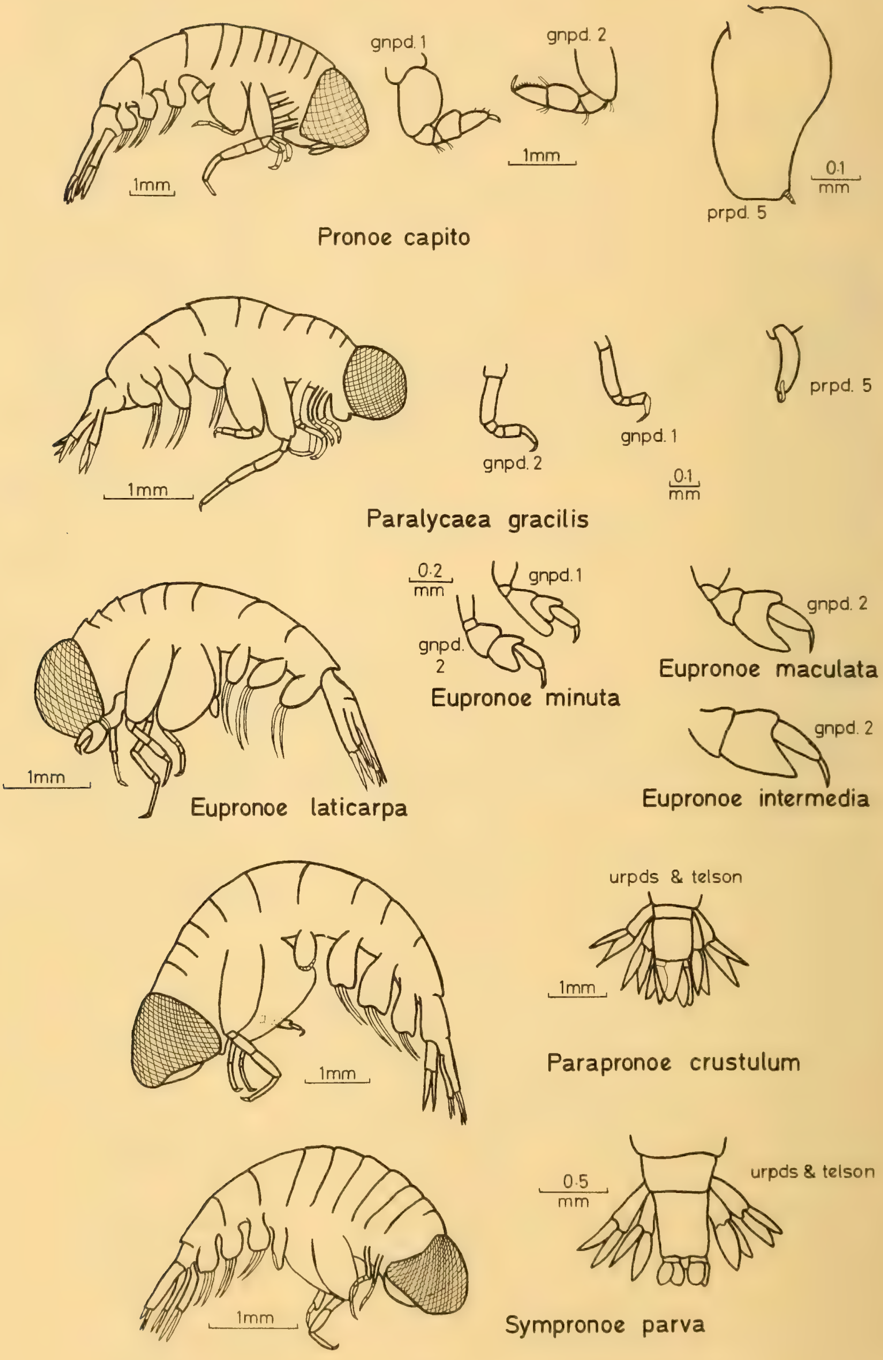

FIG. 11. Family *Pronoidae*

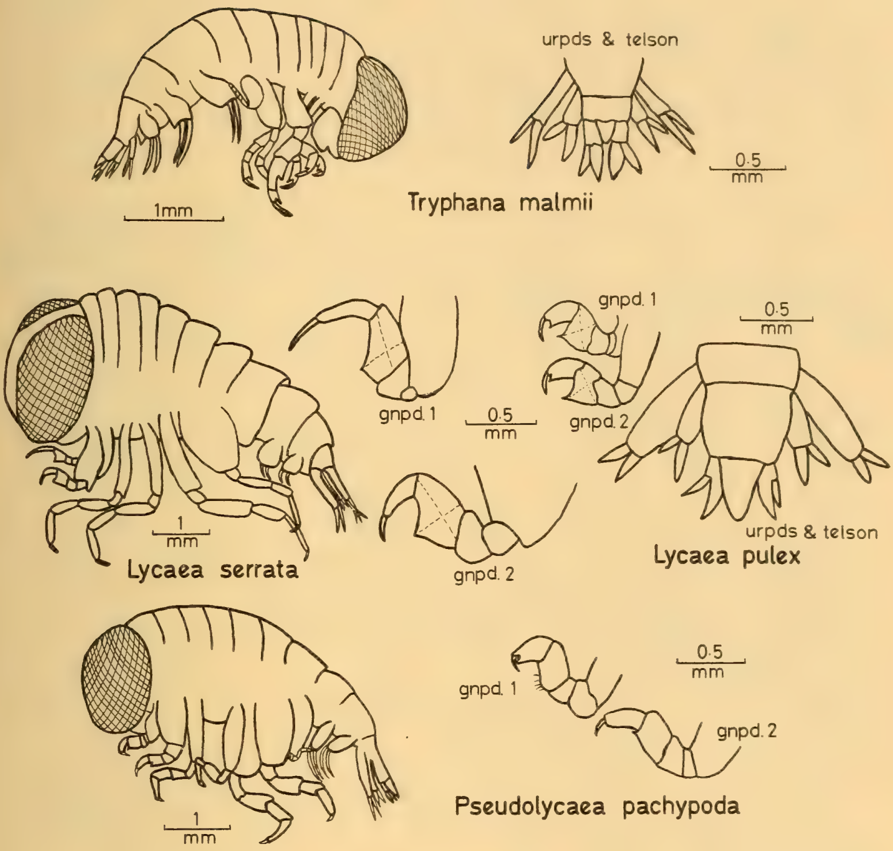

FIG. 12. Family *Lycaeidae*

3. Fifth joint of gnathopods 1 and 2, length greater than maximum width; pleon
   segments with strong middorsal ridges . . . . . . *Lycaea serrata*
   Fifth joint of gnathopods 1 and 2, length subequal to maximum width 4
4. Inner ramus of uropod 2 fused with peduncle . . . . . . *L. nasuta*
   Inner ramus of uropod 2 not fused with peduncle . . . . . . *L. pulex*

KEY TO THE GENERA AND SPECIES OF SOUTH AFRICAN BRACHYSCELIDAE

1. Pereiopods 1 to 4, 4th and 5th joints with long hairs on anterior and posterior
   margins . . . . *Thamneus platyrrhynchus*
   Pereiopods 1 to 4, 4th and 5th joints without long hairs . . *Brachyscelus* 2
2. Gnathopods 1 and 2, process of 5th joint has major teeth interspersed with minor
   ones; uropod rami not broad . . . . *B. rapacoides*
   Gnathopods 1 and 2, process of 5th joint has major teeth only; uropod rami broad
   B. crusculom

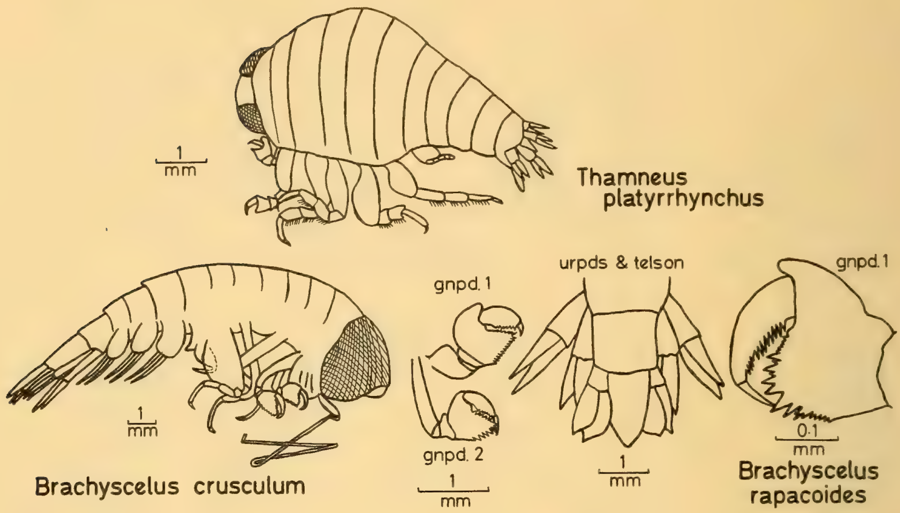

Fig. 13. Family *Brachyscelidae*

Key to the Genera and Species of South African Oxycephalidae

1. Inner rami of uropods not fused with peduncles 2
Inner rami of one or more pairs of uropods fused with peduncles 7
2. Head elongate with a long pointed rostrum .. .. .. *Streetsia* 3
Head globular with a short rostrum 6
3. Head plus rostrum subequal to length of peraeon, or shorter 4
Head plus rostrum longer than peraeon 5
4. Rostrum about half length of eyes; no obvious constriction of head posterior to eyes .. .. *Streetsia steenstrupi*
Rostrum longer than eyes; head obviously constricted posterior to eyes *S. mindanaonis*
5. Rostrum as long, or longer than eyes .. .. *S. challengeri*
Rostrum shorter than eyes .. .. *S. porcella*
6. Rostrum sharp-pointed .. .. *Cranocephalus scleroticus*
Rostrum blunt, beaked .. .. *Glossocephalus milne-edwardsi*
7. Inner ramus of uropod 2 not fused with peduncle; 1st urosome segment about one-third combined length of 2nd and 3rd segments 8
Inner ramus of uropod 2 fused with peduncle; 1st urosome segment about one-half combined length of 2nd and 3rd segments 9
8. Rostrum sharply pointed, without lateral expansions; inner ramus of uropod 1 less than a quarter length of outer ramus; uropods 1 and 2, inner margins of peduncles with large teeth .. .. *Leptocotis tenuirostris*
Rostrum dorso-ventrally flattened and pointed, with lateral expansions; rami of uropod 1 subequal; uropods 1 and 2, inner margins of peduncles with small teeth .. .. *Calamorhynchus pellucidus*
9. Rostrum very long and needle-like .. .. *Rhabdosoma* 10
Rostrum not long and needle-like 12
10. Telson as long, or longer than peduncle of uropod 3; uropods 2 and 3, rami subequal .. .. *Rhabdosoma whitei*
Telson maximally half length of peduncle of uropod 3; uropods 2 and 3, outer ramus less than a quarter length of inner ramus 11

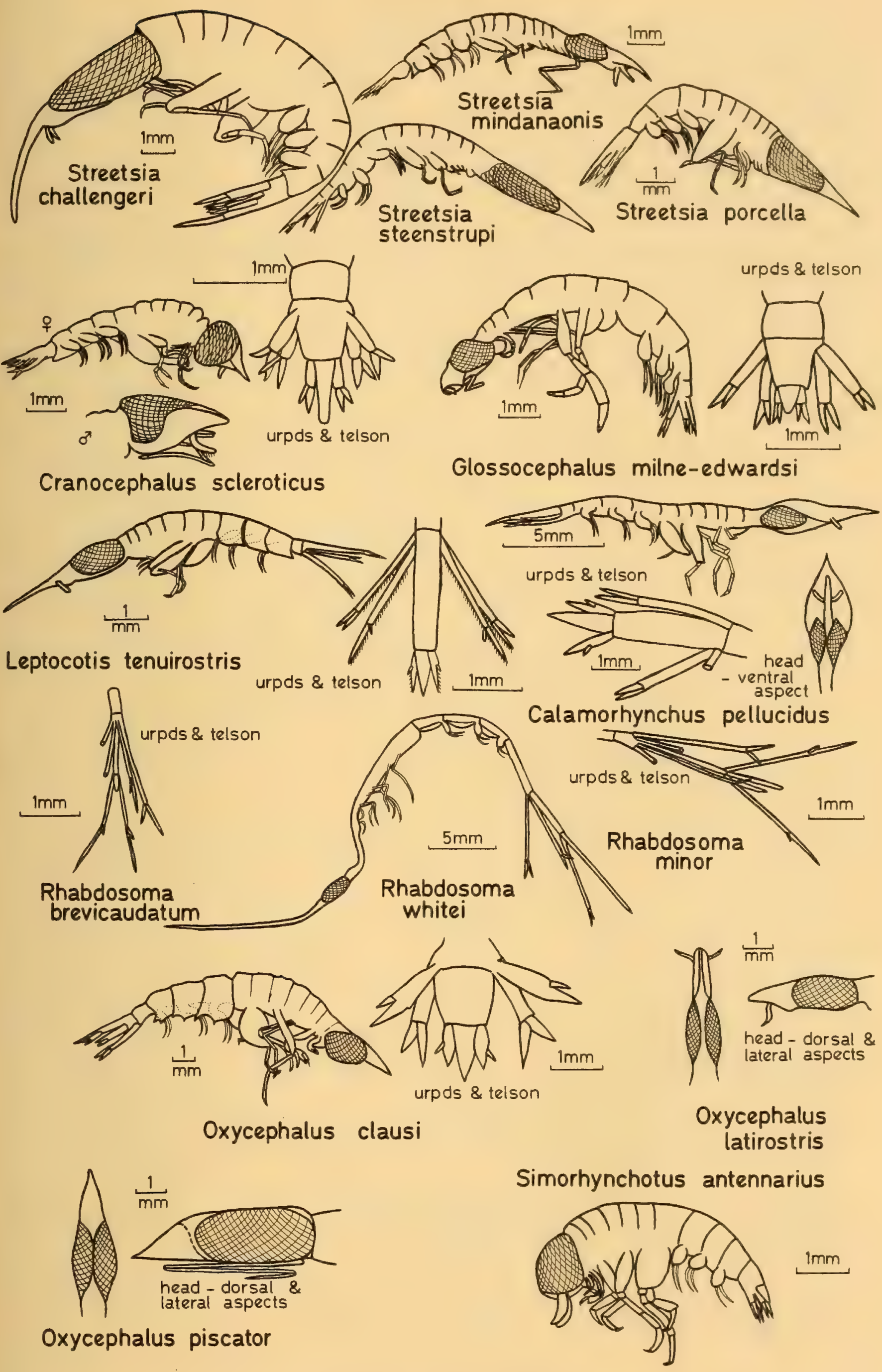

FIG. 14. Family *Oxycephalidae*

11.	Peduncle of uropod 3 not three times length of telson	*R. minor*	
	Peduncle of uropod 3 at least three times length of telson	*R. brevicaudatum*	
12.	Gnathopods 1 and 2 subchelate	*Simorhynchotus antennarius*	
	Gnathopods 1 and 2 chelate	*Oxycephalus*	13
13.	Pleon segments with two teeth at posterodistal corners	*Oxycephalus clausi*	
	Pleon segments with one tooth at posterodistal corners		14
14.	Rostrum terminally rounded	*O. latirostris*	
	Rostrum terminally pointed	*O. piscator*	

Key to the Genera and Species of South African Parascelidae

1.	Fifth joint of gnathopod 2 not produced		2
	Fifth joint of gnathopod 2 with a process as long as 6th joint which has a small inwardly directed process	*Schizoscelus ornatus*	
2.	Rami of uropod 1 narrow; 4th joint of pereiopod 4 produced well beyond insertion of 5th joint and teeth on anterior margin larger than those on anterior margin of 5th joint	*Parascelus*	3
	Rami of uropod 1 broad; 4th joint of pereiopod 4 not produced beyond insertion of 5th joint and teeth on anterior margin subequal to those on anterior margin of 5th joint	*Thyropus sphaeroma*	
3.	Second joint of pereiopod 4 not greatly tapering	*Parascelus typhoides*	
	Second joint of pereiopod 4 tapers greatly	*P. edwardsi*	

Key to the Genera and Species of South African Platyscelidae

1.	Gnathopods 1 and 2 simple, 5th and 6th joints without processes	*Paratyphis*	2
	Gnathopods 1 and 2 either chelate or subchelate, 5th and 6th joints with processes		4
2.	Second joint of pereiopod 3 with a distal notch for insertion of 3rd joint		3
	Second joint of pereiopod 3 with distal margin rounded and 3rd joint inserted subterminally on inner surface	*Paratyphis spinosus*	
3.	Outer ramus of uropod 3 three-quarters length of inner ramus	*P. promontorii*	
	Outer ramus of uropod 3 half length of inner ramus	*P. maculatus*	
4.	Sixth joint of gnathopods 1 and 2 not produced		9
	Sixth joint of gnathopods 1 and 2 produced		5
5.	Gnathopods 1 and 2 complexly chelate, 5th joint produced beyond insertion of 6th joint	*Amphithyrus*	6
	Gnathopods 1 and 2, 5th joint not produced	*Tetrathyrus forcipatus*	
6.	Fifth peraeonal epimeral plate bears a diagonally projecting spine	*Amphithyrus bispinosus*	
	Fifth peraeonal epimeral plate bears no spine		7
7.	Telson base broader than, or as broad as telson is long; body and appendages with sculptured surfaces	*A. sculpturatus*	
	Telson base width less than, or equal to length of telson; body and appendages with smooth surfaces		8
8.	Fourth joint of pereiopod 4 produced beyond insertion of 5th joint and 5th joint produced beyond insertion of 6th joint; telson terminally rounded	*A. glaber*	
	Fourth joint only of pereiopod 4 produced; telson terminally pointed	*A. similis*	
9.	Gnathopod 1 chelate, process of 5th joint about two-thirds length of 6th joint	*Hemityphis rapax*	
	Gnathopod 1 chelate, process of 5th joint subequal to 6th joint	*Platyscelus*	10
10.	Sixth joint of pereiopod 1 less than half length of 5th joint	*P. armatus*	
	Sixth joint of pereiopod 1 subequal to 5th joint		11
11.	Anterior margin of 6th joint of gnathopods 1 and 2 toothed along whole length	*P. ovoides*	
	Anterior margin of 6th joint of gnathopods 1 and 2 smooth	*P. serratulus*	

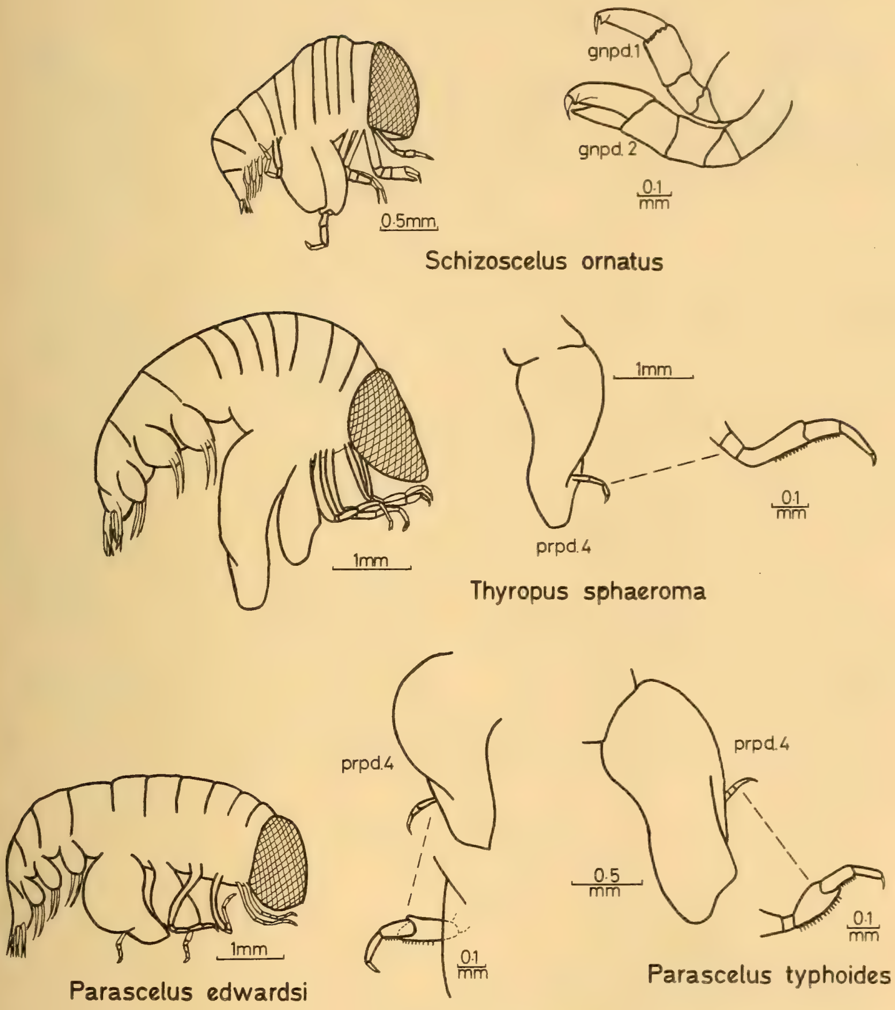

Fig. 15. Family *Parascelidae*

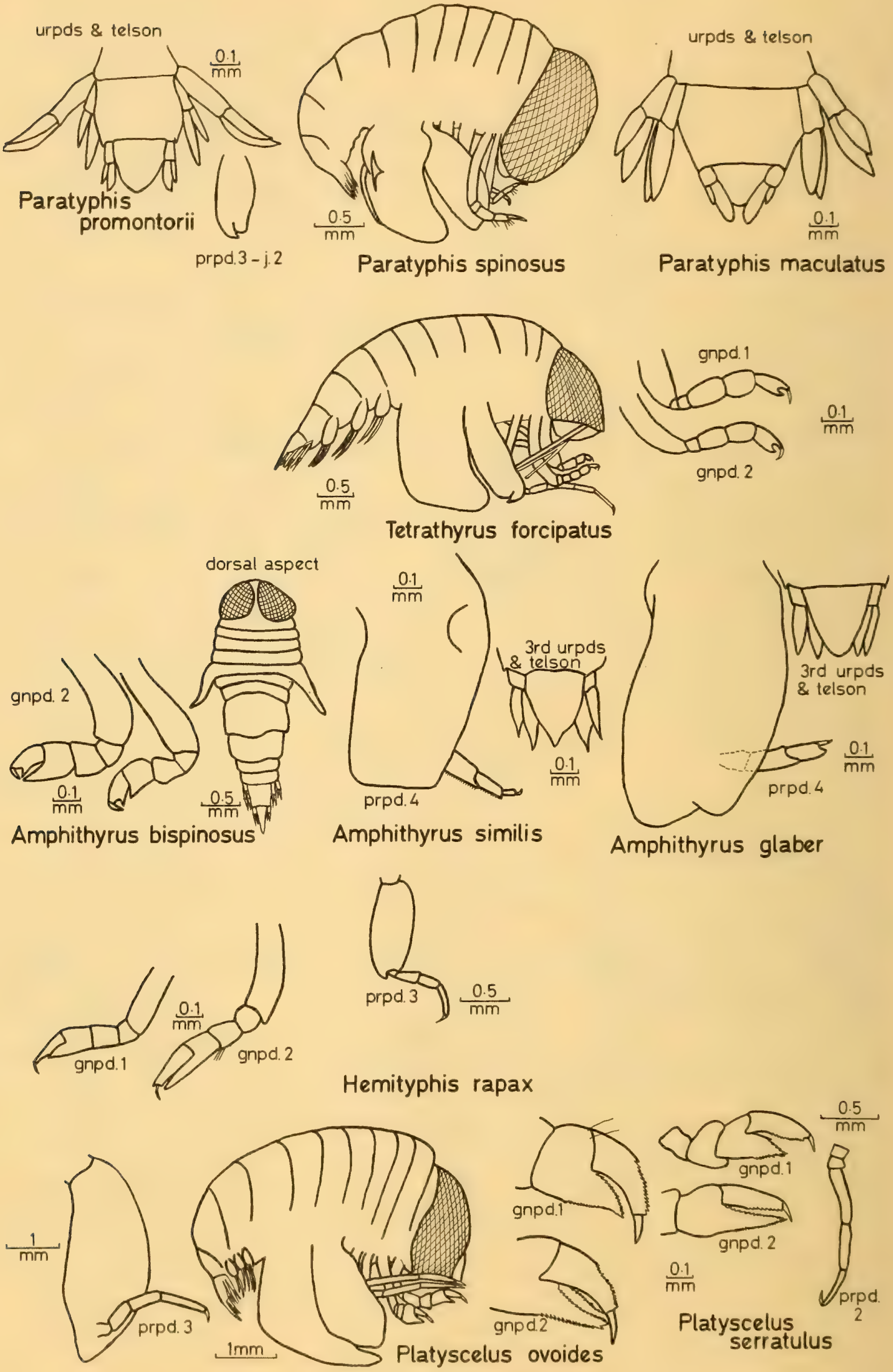

FIG. 16. Family *Platyscelidae*

Distribution List of South African Hyperiid Amphipoda

(A key to authors' numbers used appears before the references)

Family **Lanceolidae** Bovallius, 1887

Lanceola pacifica Stebbing, 1888

Synonymy: Barnard, K. H., 1932: 254.

World distribution: Atlantic 5:255; 17:135; 32:44; 36:11; 43:209; 50:30; 53:14; 72:64; Pacific 48:1306; 63:195.

South African records:
Barnard, K. H., 1932. 33/16, 950–850 m.

Remarks: The species is widely distributed in the tropical and temperate regions of the oceans. The South African record only confirms the mesopelagic nature of the species.

Lanceola serrata Bovallius, 1885

Synonymy: Barnard, K. H., 1932: 255.

World distribution: Atlantic 5:254; 17:136; 43:209; 48:1315; 53:15; 57:67; 59:17; Indian 5:255; Pacific 63:195.

South African records:
Barnard, K. H., 1932. 34/16, 1410–1310 m.

Remarks: The species is known from widely separated records in temperate regions. The mesopelagic nature of the species is confirmed by the South African record.

Scypholanceola vanhoeffeni Woltereck, 1905

Synonymy: Barnard, K. H., 1932: 257.

World distribution: Atlantic 1:291; 5:257; 17:139–140; 32:45; 43:215–218; 71:414; Indian 64:7; 71:414; Pacific 63:196; 64:7.

South African records:
Barnard, K. H., 1916. 34/17.
Barnard, K. H., 1932. 34/16.

Remarks: The species is known from widely distributed records, mainly in temperate regions. The South African records only consolidate the information on the geographic range of the species.

Family **Scinidae** Stebbing, 1888

Scina borealis (G. O. Sars, 1882)

Synonymy: Wagler, 1926: 335.

World distribution: Atlantic 5:260; 17:143–145; 32:79; 36:13; 38:20; 43:230; 44:8; 50:28; 53:30; 54:10; 57:66; 59:9; 65:104; 66:343; 67:94–95; Indian 6:181; 44:8; 62:162; 64:12; 66:344; 67:94–95; 69:53; Pacific 3:401; 26:9; 33:9; 61:86; 63:206; 64:12; Mediterranean 22:190; 53:30.

South African records:
Wagler, 1926. 33/16, 33/18.
Wagler, 1927. 35/13.
Barnard, K. H., 1932. 34/16.
Siegfried, 1963. Sectors 1, 2, 3.
NGY Samples. 30/30, 5–0 m.
Division of Sea Fisheries Routine Programme Cruises, 1963. 34/17, 150–0 m.

Remarks: The species is almost completely cosmopolitan in its geographic distribution. The South African records suggest that it may be both eurythermal and euryhaline in nature.

Scina crassicornis (Fabricius, 1775)

Synonymy: Wagler, 1926: 324.

World distribution: Atlantic 3:401; 5:258; 10:279; 17:146–148; 20:203; 32:65–66; 36:12; 43:228; 44:8; 48:1277; 49:365; 50:25; 53:19–21; 54:9; 59:7; 66:328; 67:90; Indian 6:181; 44:8; 62:163; 66:328; 67:90; 69:52; Pacific 3:401; 26:8; 27:278; 48:1277.

South African records:
Wagler, 1926. 33/16, 33/18, 34/18.
Wagler, 1927. 33/18.
Barnard, K. H., 1932. 34/16, 250–0 m.
Siegfried, 1963. Sectors 1, 2, 3, 4.

Remarks: The species is known from numerous widely scattered records in tropical and temperate regions. The South African records suggest a possible preference for warm temperate conditions.

Scina curvidactyla Chevreux, 1914

Synonomy: Wagler, 1926: 328.

World distribution: Atlantic 3:401; 5:259; 17:148; 43:230; 53:31; 66:331; 67:92; Indian 6:181; 66:331; Mediterranean 17:148.

South African records:
NGY Samples. 31/29, 5–0 m.

Remarks: A rare species known from relatively few records in tropical and temperate regions. It is a new addition to the South African hyperiid fauna. The solitary record consolidates the information on the geographic range in the Indian ocean, in which region records are particularly scarce.

Scina excisa Wagler, 1926

World distribution: Atlantic 43:230; 66:401; 67:104; Indian 66:401; 67:104.

South African records:
Wagler, 1926. 33/18.

Remarks: On the basis of present information this species is particularly rare. The known records are from tropical and temperate regions.

Scina incerta Chevreux, 1900

Synonymy: Wagler, 1926: 331.

World distribution: Atlantic 5:260; 16:123; 17:150; 43:230; 66:335; 67:93; Indian 66:335; Pacific 63:205.

South African records:
Barnard, K. H., 1932. 34/16.

Remarks: An uncommon species known from widely scattered records in tropical and temperate regions.

Scina langhansi Wagler, 1926

World distribution: Atlantic 5:260; 66:337.

South African records:
Barnard, K. H., 1932. 34/16.

Remarks: A very rare species only recorded from the tropical and temperate regions of the Atlantic.

Scina marginata (Bovallius, 1885)

Synonymy: Wagler, 1926: 361.

World distribution: Atlantic 5:261; 16:122; 17:154; 32:76; 43:232; 50:26; 53:27–28; 65:110; 67:98; Indian 6:181.

South African records:
NGY Samples. 31/25, 150–0 m.

Remarks: An uncommon species known from scattered records in tropical and temperate regions. The NGY record is a new record for the South African region.

Scina nana Wagler, 1926

World distribution: Atlantic 66:395; 67:103; Indian 66:395; 67:103; Pacific 26:9.

South African records:
Wagler, 1926. 33/18.
Wagler, 1927. 33/16, 250–0 m.
NGY Samples. 35/26, 150–0 m.

Remarks: A rare species known from widely separated records in tropical and temperate regions. The NGY record and that of Wagler (1927) suggest that the species may be epipelagic in nature but further information on the depth distribution is needed for confirmation of this.

Scina oedicarpus Stebbing, 1895

Synonymy: Wagler, 1926: 369.

World distribution: Atlantic 5:261; 17:155; 32:67, 68; 49:357; 50:25; 59:11; 66:372; 67:100; Indian 66:372.

South African records:
Wagler, 1926. 33/18.
Barnard, K. H., 1932. 34/16.

Remarks: An uncommon species recorded mainly from the tropical regions of the Atlantic.

Scina rattrayi Stebbing, 1895

Synonymy: Wagler, 1926: 375.

World distribution: Atlantic 5:261; 16:123; 17:156; 32:84; 49:359; 50:27; 53:29; 59:10; 66:380; 67:104; Indian 66:380; 67:104; Red Sea 66:380.

South African records:
Wagler, 1926. 33/18.

Remarks: An uncommon species recorded mainly from the tropical regions of the Atlantic.

Scina similis Stebbing, 1895

Synonymy: Wagler, 1926: 390.

World distribution: Atlantic 17:157; 32:85; 49:363; 66:393; 67:102; Indian 66:393; 67:102; Mediterranean 53:29.

South African records:
NGY Samples. 33/28, 150–0 m.

Remarks: A rare species with a wide distribution, mainly in tropical areas. It is new to the South African region.

Scina stenopus Stebbing, 1895

Synonymy: Wagler, 1926: 419.

World distribution: Atlantic 17:158; 32:66; 43:233; 49:356; 65:104; 66:422; 67:108; Indian 66:422; 67:108.

South African records:
Wagler, 1926. 33/18, 34/18.
NGY Samples. 30/31, 31/30, 31/31, 34/25, 34/27, 35/26: 150–0 m.
Division of Sea Fisheries Routine Programme Cruises, 1963. 32/17, 150–0 m.

Remarks: Prior to the present study, the species was known mainly from records in the tropical regions of the Atlantic. In the NGY samples it was the most abundant member of the genus *Scina*, which suggests that it has a preference for warm conditions.

Scina tullbergi (Bovallius, 1885)

Synonymy: Wagler, 1926: 384.

World distribution: Atlantic 5:261; 17:146; 32:85; 43:232; 44:8; 49:362, 365; 65:113; 66:389; 67:101; Indian 64:13; 66:389; Pacific 4:126; 26:9; Mediterranean 17:146.

South African records:
Siegfried, 1963. Sectors 2, 3.

Remarks: The species is known from widely distributed records in tropical and temperate regions.

Scina uncipes spinosa var. ***affinis*** Wagler, 1927

Synonymy: Wagler, 1926: 352. Wagler, 1927: 96.

World distribution: Atlantic 5:260; 67:96; Indian 66:354; 67:96.

South African records:
As *Scina uncipes* Stebbing, 1895, forma *affinis* Wagler, 1926. Barnard, K. H., 1932. 34/16.

Remarks: A relatively uncommon species known from widely separated records in tropical and temperate regions. Several subspecies and forms of these are described, producing a situation which is badly in need of clarification when enough material for comparative studies can be accumulated.

Scina woltereckі Wagler, 1926

World distribution: Atlantic 5:261; 66:375; 67:100; Indian 64:13; 66:375; Pacific 63:207.

South African records:
Wagler, 1926. 33/18.

Remarks: A rare species known from widely separated records in tropical and temperate regions.

Ctenoscina brevicaudata Wagler, 1926

World distribution: Atlantic 66:439; Indian 64:15; 66:439.

South African records:
Wagler, 1926. 33/18.

Remarks: A very rare species known from widely separated records in tropical and temperate regions.

Family **Vibiliidae** Claus, 1872

Vibilia antarctica Stebbing, 1888

Synonymy: Barnard, K. H., 1932: 263.

World distribution: Atlantic 5:263; 8:486; 18:514; 47: charts facing 102, 103; Indian 3:404; 27:278; 64:16; Antarctica 5:263.

South African records:
Behning, 1925. 34/18, 35/18.

Remarks: The species is apparently restricted to the temperate and polar regions of the southern hemisphere.

Vibilia armata Bovallius, 1887

Synonymy: Behning, 1927: 119.

World distribution: Atlantic 2:376; 5:264–265; 8:491; 9:121: 17:169–170, 173; 20:203; 23:300; 32:101; 36:13; 40:222; 44:8; 50:31; 53:48; 57:64; 58:250; 59:15; 65:125; Indian 3:404; 6:182; 8:491; 44:8; 62:164; 64:16; 69:53; Pacific 3:404; 4:126; 14:388–389; 26:11; 27:279; 29:32; 33:11; Mediterranean 22:190; 53:46–48.

South African records:
Barnard, K. H., 1925. 33/27.
Behning, 1925. 33/16, 33/18, 34/18.
Siegfried, 1963. Sectors 1, 2, 3, 4.
Division of Sea Fisheries IIOE Cruise I. 26/36, 300–0 m.
Division of Sea Fisheries Routine Programme Cruises, 1963. 32/14, 32/15, 32/16, 32/17, 33/16, 33/18, 34/16, 34/17, 34/18, 35/16, 35/17, 35/18, 36/18, 36/19: 150–0 m. and 5–0 m.
As *Vibilia gracilenta* Bovallius, 1887, Stewart, 1913. 34/15.

Remarks: This species has a wide distribution in tropical and temperate regions. Its distribution in South African waters suggests a preference for hydrological conditions associated with warm temperate regions.

Vibilia chuni Behning & Woltereck, 1912

World distribution: Atlantic 8:496; 9:121; 32:99; 58:251; Pacific 3:405; 27:279.

South African records:
NGY Samples. 31/25, 150–0 m.

Remarks: A rare species known from widely separated records in tropical and temperate regions. The NGY record is both the first for the Indian ocean and for the South African region.

Vibilia cultripes Vosseler, 1901

World distribution: Atlantic 5:265; 8:495; 9:121; 17:172–173; 32:100; 43:234; 44:8; 53:54; 65:123; Indian 8:495; Mediterranean 17:173; 53:53–54.

South African records:
Siegfried, 1963. 24/14, 150–0 m.

Remarks: An uncommon species known mainly from the tropical and temperate regions of the Atlantic. Siegfried's record is the first from the South African region.

Vibilia propinqua Stebbing, 1888

Synonymy: Behning, 1927: 118.

World distribution: Atlantic 3:404; 5:263; 8:484; 9:121; 17:174; 20:203; 32:97–98; 44:8; 50:32; 53:44; 58:246; 59:14; 65:125; Indian 6:182; 8:484; Pacific 3:404; 27:279; 48:1283; Mediterranean 53:43–44.

South African records:
Siegfried, 1963. Sector 2.

Remarks: A species with a wide distribution in tropical and temperate regions only recently recorded by Siegfried (1963) from the South African region.

Vibilia stebbingi Behning & Woltereck, 1912

Synonymy: Behning, 1927: 118.

World distribution: Atlantic 3:403–404; 8:482; 9:121; 17:175; 23:300; 32:97; 53:40; Indian 28:111; 64:15; Pacific 3:404; 25:125; 27:279; 28:111; 64:15; Mediterranean 53:40.

South African records:
NGY Samples. 34/25, 150–0 m.
Division of Sea Fisheries Routine Programme Cruises, 1963. 32/14, 32/15, 32/16, 32/17, 33/16, 33/17, 34/15, 34/16, 35/15, 35/16, 35/17, 35/18, 36/19, 37/17, 37/18: 150–0 m and 5–0 m.

Remarks: A widely distributed species known from temperate and tropical regions which becomes exceedingly abundant when salp swarms occur. It is new to the list of hyperiids from South African waters.

Vibilia viatrix Bovallius, 1887

Synonymy: Behning, 1927: 117.

World distribution: Atlantic 3:403; 5:262; 8:482; 9:121; 17:175–176; 20:204; 32:96; 36:14; 43:234; 44:8; 53:41; 58:247; 65:124; Indian 8:482; 44:8; 62:160–161; 69:53; Red Sea 45:22; Pacific 3:403; 4:126; 14:389; 24:492; 26:10; 29:32; 33:10; 42:41; 48:1287; Mediterranean 53:41.

South African records:
Siegfried, 1963. Sectors 1, 2, 3.
NGY Samples. 30/31, 31/30: 150–0 m.
Division of Sea Fisheries Routine Programme Cruises, 1963. 33/16, 34/17, 35/15, 37/18: 150–0 m and 5–0 m.

Remarks: The species is widely distributed in temperate and tropical regions. The reduced abundance in the Indian ocean is probably due to the lower number of samples taken in this region rather than to biological or hydrological reasons.

Cyllopus magellanicus Dana, 1852

Synonymy: Barnard, K. H., 1930: 408.

World distribution: Atlantic 5:266; 58:248; Indian 3:408; 28:111; 64:17; Pacific 3:408; 25:132; 28:111; 64:17; Antarctica 5:266; 28:111; 64:17.

South African records:
Barnard, K. H., 1932. 34/16.

Remarks: The species is restricted to the temperate and polar regions of the oceans of the southern hemisphere. Its presence in South African waters at considerable depth is no doubt due to upwelling of Antarctic water.

Family **Paraphronomidae** Bovallius, 1887

Paraphronima crassipes Claus, 1879

Synonymy: Shoemaker, 1945: 234.

World distribution: Atlantic 3:409; 5:268; 16:136; 17:179; 32:106; 36:15; 43:234; 44:8; 46:166; 55:77; 58:253; 65:100; Indian 6:183; 28:113; 62:160–161; 64:18; Pacific 3:409; 4:127; 14:391; 26:13; 27:280; 63:209; 64:18; Mediterranean 55:77.

South African records:
Barnard, K. H., 1932. 34/16, 250–0 m.
Siegfried, 1963. Sectors 2, 3, 4.
NGY Samples. 30/31, 31/31, 32/30, 34/26: 150–0 m and 5–0 m.
Division of Sea Fisheries IIOE Cruise I. 26/34, 300–0 m.
Division of Sea Fisheries Routine Programme Cruises, 1963. 35/15, 35/20, 36/18: 150–0 m.

Remarks: A very widely distributed species known from tropical and temperate regions. It is widely distributed in waters off the coasts of South Africa.

Paraphronima gracilis Claus, 1879

Synonymy: Spandl, 1927: 165.

World distribution: Atlantic 5:267; 16:135; 17:179–180; 20:202; 23:300; 32:104–105; 44:8; 46:165; 55:75–76; 58:253; 65:100; Indian 6:183; 62:165; 69:52; Pacific 14:390–1; 26:13; 33:12; Mediterranean 55:75.

South African records:
Barnard, K. H., 1932. 29/14, 200–0 m.
Siegfried, 1963. Sectors 3, 4.
NGY Samples. 29/32, 30/31, 31/30, 32/30, 33/28, 34/25, 34/26, 34/27: 150–0 m.
Division of Sea Fisheries IIOE Cruise I. 26/34, 26/35: 300–0 m.
Division of Sea Fisheries Routine Programme Cruises, 1963. 33/16, 36/19: 150–0 m.

Remarks: Previous records indicate that the species has a wide distribution in tropical and temperate regions. The distribution in South African waters seems to indicate a preference for warmer conditions.

Family **Cystisomidae** Willemoes-Suhm, 1875

Cystisoma africanum K. H. Barnard, 1916

World distribution: Indian 1:289.

South African records:
Barnard, K. H., 1916. 33/27.

Remarks: This species has only been recorded once. According to the logbook of the *Pieter Faure* in the South African Museum the type specimen was a moult. It is not present in the museum collection. Future work on South African members of the genus *Cystisoma* may place the species under *C. spinosum.*

Cystisoma coalitum (Woltereck, 1903)

World distribution: Atlantic 70:458; Indian 70:458.

South African records:
Woltereck, 1903. 33/18.

Remarks: This species is only known from Woltereck's records in the Atlantic and Indian oceans. Like the previous species its status may change when the genus *Cystisoma* is revised.

Family **Hyperiidae** Dana, 1852

Hyperia atlantica Vosseler, 1901

Synonymy: Yang, 1960: 28.

World distribution: Atlantic 43:300; 65:70; 73:32.

South African records:
Division of Sea Fisheries Routine Programme Cruises, 1963. 33/15, 35/15, 35/18: 150–0 m and 5–0 m.

Remarks: Prior to the present study this species had only been recorded from the temperate and tropical regions of the north-western Atlantic. The present records are therefore the first from the South Atlantic.

Hyperia crucipes Bovallius, 1889

World distribution: Atlantic 55:90; Indian 6:184; 68:236.

South African records:

Division of Sea Fisheries Routine Programme Cruises, 1962. 35/20, 5–0 m.

Remarks: A very rare species previously known from widely separated records in temperate and tropical regions. It is new to the south-west Indian ocean.

Hyperia fabrei (Milne-Edwards, 1830)

Synonymy: Yang, 1960: 33.

World distribution: Atlantic 3:410; 20:201; 23:300; 36:15; 46:153; 55:83; 65:59; 73:35; Red Sea 45:22; Pacific 3:410.

South African records:
Division of Sea Fisheries Routine Programme Cruises, 1963. 32/16, 33/16, 35/15, 35/17, 35/19, 36/19: 150–0 m and 5–0 m.

Remarks: An uncommon species recorded mainly from tropical and temperate regions in the Atlantic. The present records are the first from the south-eastern Atlantic and south-western Indian oceans.

Hyperia gaudichaudi Milne-Edwards, 1840

Synonymy (discussed): Barnard, K. H., 1932: 273. Hurley, 1955: 143.

World distribution: Atlantic 1:286; 3:411; 5:273; 18:513; 44:8; Pacific 3:411; 48:1398.

South African records:
Barnard, K. H., 1916. West coast—on scyphomedusae.
Division of Sea Fisheries Routine Programme Cruises, 1963. 32/18, 33/16, 33/17, 33/18, 34/18: 60–0 m and 5–0 m.
As *Hyperia galba* (Montagu, 1813). Siegfried, 1963. Sectors 1, 2, 3, 4.

Remarks: Bowman (personal communication) asserts that all reliable records of this species indicate its restriction to cold temperate and polar regions of the southern hemisphere oceans, being replaced in the northern hemisphere by *H. galba*.

Hyperia macrodactyla Stephensen, 1924

World distribution: Atlantic 73:38; Pacific 27:279; Mediterranean 55:90.

South African records:
Division of Sea Fisheries Routine Programme Cruises, 1963. 33/15, 35/17: 150–0 m.

Remarks: An apparently rare species known from widely separated records in tropical and temperate regions. The South African records are the first from the south-eastern temperate Atlantic.

Hyperia macrophthalma Vosseler, 1901

Synonymy: Yang, 1960: 19.

World distribution: Atlantic 23:300; 55:92; 65:71; 73:24; Mediterranean 55:92.

South African records:
Division of Sea Fisheries Routine Programme Cruises, 1963. 33/15, 33/16, 34/17, 35/17, 35/18, 35/20: 150–0 m and 5–0 m.

Remarks: Prior to the present study, this species was only recorded from the tropical and temperate regions of the North Atlantic and the Mediterranean. The South African records are the first from the south-eastern Atlantic and south-western Indian oceans.

Hyperia schizogeneios Stebbing, 1888

Synonymy: Yang, 1960: 15.

World distribution: Atlantic 3:411; 16:139–140; 17:188–189; 20:201; 23:300; 32:121–122; 44:8; 48:1387, 1393; 55:87; 58:256; 65:64, 67; 73:18; Indian 6:183; 44:8; 62:160–161; Pacific 3:411; 29:32; 33:16–17; 62:48, 58; Mediterranean 22:193; 55:86–87.

South African records:
Division of Sea Fisheries Routine Programme Cruises, 1962, 1963. 32/16, 32/17, 33/15, 33/16, 33/17, 33/18, 34/16, 34/17, 34/18, 34/19, 35/17, 35/18, 35/19, 36/19, 36/21: 150–0 m and 5–0 m.
As *Hyperia promontorii* Stebbing, 1888. Stebbing, 1888. 34/18, surface. Siegfried, 1963. Sectors 1, 2, 3, 4.

Remarks: The species is very widely distributed in tropical and temperate regions. Its abundance in South African waters has however been greatly underestimated prior to the more recent surveys. This will probably prove to be the case in the rest of the Indian and in the Pacific ocean as well.

Hyperioides longipes Chevreux, 1900

Synonymy: Shoemaker, 1945: 238.

World distribution: Atlantic 5:276; 16:143; 17:189–191; 23:300; 32:125–126; 36:18; 43:238; 44:8; 46:164; 50:36; 55:93; 58:256; 59:23; 65:63; Indian 6:184; 64:22; Pacific 3:414–415; 26:15; 27:280; 29:32; 33:20; 64:22; Mediterranean 17:189–191; 22:190; 37:148; 55:93.

South African records:
Barnard, K. H., 1932. 34/16.
Siegfried, 1963. Sectors 2, 3, 4.
NGY Samples. Uniformly distributed in waters off the east and south coasts of the Republic from Durban to Cape Seal: 150–0 m and 5–0 m.
Division of Sea Fisheries IIOE Cruise I. 26/33, 26/34, 26/35: 300–0 m.
Division of Sea Fisheries Routine Programme Cruises, 1963. 32/16, 33/16, 34/16, 34/17, 34/18, 35/18, 35/19, 35/21: 150–0 m and 5–0 m.

Remarks: It is apparent that the abundance of this species has been seriously underestimated in the Indian ocean area. In South African waters it displays a preference for near tropical conditions.

Hyperoche cryptodactylus Stebbing, 1888

World distribution: Atlantic 48:1402; Indian 68:236.

South African records:
Stebbing, 1888. 34/18, surface.

Remarks: The species is only known from the above records and its status is in doubt. Barnard (1930) infers that the original description was based on a specimen in the process of moulting.

Hyperoche martinezii (Fr. Müller, 1864)

World distribution: Atlantic 13:108.

South African records:
NGY Samples. 33/27, 34/25: 150–0 m.

Remarks: In common with most of the species within the genus, this is a very rare species but is considered valid by Barnard (1930). The NGY records are the first from the Indian ocean and apparently the only ones since the species was established.

Hyperoche mediterranea Senna, 1908

World distribution: Atlantic 17:191; Pacific 25:150; Mediterranean 39*a*:159; 55:79.

South African records:

Division of Sea Fisheries Routine Programme Cruises, 1963. 33/17, 150–0 m.

Remarks: A rare species known from widely separated records in temperate regions. It is new to the list of hyperiids from the south-eastern temperate Atlantic.

Hyperoche medusarum (Kröyer, 1838)

Synonymy: Barnard, K. H., 1930: 415.

World distribution: Atlantic 5:276; 10:279; 11:165–166; 12:139; 17:191; 23:300; 32:119; 38:9; 44:8; 54:13; 55:79; 57:61; 60:21; 65:55; Indian 28:112; 44:8; Pacific 25:147; 26:14; 61:89; 63:211.

South African records:

Siegfried, 1963. Sectors 1, 2, 3.
Division of Sea Fisheries Routine Programme Cruises, 1963. 33/18, 35/17: 5–0 m.

Remarks: This species, the most common in the genus, is widely distributed in cold temperate and polar regions. In South African waters it is restricted, along with other members of the genus, to the cold upwelled neritic waters near the coasts.

Parathemisto gaudichaudi (Guérin Méneville, 1825)

Synonymy: Bowman, 1960: 379.

World distribution: Atlantic 2:374; 3:420; 5:280; 10:279; 11:156–165; 12:142–144; 16:146; 17:191–192; 18:514; 23:300; 32:129; 35:78; 38:13, 15; 40:222; 44:8; 47: charts facing 102, 103; 48:1409; 50:38; 54:27–29, 31–32; 55:104–105, 107; 57:63–64; 58:256, 257; 59:24; 60:21; 65:84, 85; Indian 5:281; 28:112; 44:8; 46:165; 48:1413, 1416; 64:22; Pacific 3:420; 25:163; 28:112; 48:1413; 64:22; Mediterranean 55:104, 107.

South African records:

Barnard, K. H., 1932. 33/16, 1410–1310 m.
Siegfried, 1963. Sectors 1, 2, 3, 4.
Division of Sea Fisheries Routine Programme Cruises, 1963. 32/14, 32/16, 32/17, 33/16, 33/17, 33/18, 34/15, 34/16, 34/17, 34/18, 34/19, 35/16, 35/17, 35/18, 35/19, 36/20, 37/21: 150–0 m and 5–0 m.
As *Euthemisto gaudichaudi* (Guérin, 1825). Barnard, K. H., 1925. 33/18, surface.

Remarks: The species is widely distributed in the temperate regions of both hemispheres and penetrates both the Arctic and Antarctic regions. In South African waters it is confined to areas where water originating from upwelling occurs.

Phronimopsis spinifera Claus, 1879

Synonymy: Shoemaker, 1945: 242.

World distribution: Atlantic 16:138; 43:242; 46:165; 55:111; 65:54; Indian 62:160–161; 69:51; Red Sea 45:23; Pacific 26:13; 29:32; 33:20; 48:1377; 62:58; Mediterranean 55:111.

South African records:
NGY Samples. 30/31, 30/32, 31/31, 32/29, 32/30, 33/27, 33/28, 34/23, 34/25, 34/26, 35/26: 150–0 m and 5–0 m.
Division of Sea Fisheries IIOE Cruise I. 26/33, 26/34, 26/35: 300–0 m.
Division of Sea Fisheries Routine Programme Cruises, 1963. 33/15, 34/16, 34/17, 35/19: 150–0 m and 5–0 m.

Remarks: A relatively uncommon species widely distributed in tropical and temperate regions. The distribution in South African waters suggests a preference for near tropical and tropical conditions. It is new to the South African faunal list.

Family **Dairellidae** Vosseler, 1901

Dairella latissima Bovallius, 1887

Synonymy: Spandl, 1927: 169.

World distribution: Atlantic 5:282; 17:184; 23:300; 32:108; 36:19; 46:169; 48:1346; 55:112; 58:254; 59:18; 65:51; Indian 6:184; Mediterranean 17:184; 55:112.

South African records:
Barnard, K. H., 1932. 34/16.
Division of Sea Fisheries Routine Programme Cruises, 1963. 34/16, 34/17, 35/18: 150–0 m and 5–0 m.

Remarks: A rare species previously known mainly from records in the tropical and temperate regions of the North Atlantic. The latest records only consolidate the information on distribution in the temperate region of the south-eastern Atlantic.

Family **Phronimidae** Dana, 1852

Phronima atlantica Guérin Menéville, 1836

Synonymy: Shih, 1969: 14, 15.

World distribution: Atlantic 3:422; 5:285; 10:279; 11:166; 16:137; 17:184; 20:202; 30:132; 32:113–114; 36:20; 41:57; 43:236; 44:9; 55:122–123; Indian 6:185; 7:484; 28:113; 30:132; 41:57; 44:9; 62:160–161; Red Sea 45:24; Pacific 3:422; 33:14; 41:57; 48:1352; 64:20; Mediterranean 17:184; 41:57; 55:121–122.

South African records:
Barnard, K. H., 1932. 34/16.
Barnard, K. H., 1940. 29/31, surface.
Siegfried, 1963. Sectors 1, 2, 3, 4.
Shih, 1969. 23/38, 24/36, 35/23, 35/18, 30/13: 300–0 m, 100–0 m and 50–0 m.

NGY Samples. 30/32, 31/31, 34/25, 35/26: 150–0 m and 5–0 m.
Division of Sea Fisheries IIOE Cruise I. 26/34, 300–0 m.
Division of Sea Fisheries Routine Programme Cruises, 1963. 32/15, 32/16, 32/17, 33/15, 33/16, 33/17, 34/15, 34/16, 34/17, 35/16, 35/18, 36/19, 37/21: 150–0 m and 5–0 m.

Remarks: A common species widely distributed in tropical and temperate regions. The wide tolerances of the species are confirmed by the occurrence of the species off South Africa in hydrological conditions ranging from tropical to warm temperate.

Phronima colletti Bovallius, 1887

Synonymy: Shih, 1969: 21.

World distribution: Atlantic 5:286; 16:137; 17:184–185; 20:202; 30:139; 32:115; 35:70; 36:20; 41:59; 43:236; 44:9; 55:128; 65:36; Indian 6:186; 7:484; 30:139; 41:59; 44:9; 62:160–161; Pacific 26:17; 27:280; 29:32; 33:15; 41:59; Mediterranean 41:59; 55:128.

South African records:
Barnard, K. H., 1940. 29/31, surface.
Siegfried, 1963. Sectors 1, 2, 4.
Shih, 1969. 23/38, 24/36, 31/30, 30/13: 300–0 m, 100–0 m and 50–0 m.
NGY Samples. 30/30, 30/32, 31/29, 32/30, 34/26, 35/26: 150–0 m.
Division of Sea Fisheries IIOE Cruise I. 26/33, 26/34, 26/35, 26/37: 300–0 m.
Division of Sea Fisheries Routine Programme Cruises, 1963. 34/18, 150–0 m and 5–0 m.

Remarks: Although the species is widely distributed in tropical and temperate areas, like the previous species the distribution in South African waters shows a preference for tropical and subtropical conditions.

Phronima pacifica Streets, 1887

Synonymy: Shih, 1969: 18.

World distribution: Atlantic 3:423; 5:285; 17:185; 30:140; 36:21; 41:58; 43:236; 44:9; 48:1350; 55:130; 65:32; Indian 41:58; 69:51; Red Sea 45:25; Pacific 41:58; 62:58.

South African records:
Barnard, K. H., 1932. 29/14, 200–0 m.
Siegfried, 1963. Sectors 2, 3.
Shih, 1969. 23/38, 24/36, 32/30: 100–0 m and 50–0 m.
NGY Samples. 30/32, 31/30, 33/29, 34/23, 34/26, 34/27, 35/26: 150–0 m and 5–0 m.
Division of Sea Fisheries IIOE Cruise I. 26/34, 300–0 m.
Division of Sea Fisheries Routine Programme Cruises, 1963. 32/15, 32/16, 32/17, 33/15, 33/16, 34/15, 34/16, 34/17, 35/15, 35/16, 35/17, 35/18, 36/19, 36/21, 37/18, 37/21: 150–0 m and 5–0 m.

Remarks: Prior to the present study this species was known from relatively few records in South African waters. Its preferences are not as clear as the previous species but there is some indication of a preference for warmer conditions.

Phronima sedentaria (Forskål, 1775)

Synonymy: Shih, 1969: 10, 11.

World distribution: Atlantic 3:422; 5:283; 10:279; 11:166; 16:136; 17:185–186; 20:202; 30:129; 32:111–112; 36:21; 41:55; 43:236; 44:9; 50:32; 51:475; 54:35; 55:116–117; 58:254; 59:18; 65:20; Indian 6:185; 28:113; 41:55; 44:9; 48:1356; 62:161; 64:20; 69:51; Pacific 3:422; 14:389–390; 24:490; 25:169; 26:16; 27:280; 33:13; 41:55; 48:1354, 1357; 61:92; 63:210; 64:20; Mediterranean 17:185–186; 22:190; 55:115–116; 41:55.

South African records:
Stebbing, 1910. 33/16.
Barnard, K. H., 1932. 29/14, 33/16.
Siegfried, 1963. Sectors 2, 3, 4.
Shih, 1969. 23/38, 24/36, 31/30, 35/18, 30/13: 300–0 m, 100–0 m and 50–0 m.
Division of Sea Fisheries IIOE Cruise I. 26/33, 300–0 m and 150–0 m.
Division of Sea Fisheries Routine Programme Cruises, 1963. 32/15, 32/16, 33/16, 34/16, 34/17, 35/15, 35/17, 36/19: 150–0 m and 5–0 m.

Remarks: The species is the most frequently recorded member of the genus and is very widely distributed. Its distribution in South African waters supports the wide hydrological tolerances that the world distribution infers.

Phronima solitaria Guérin Méneville, 1836

(*P. atlantica* var. *solitaria* in key to *Phronimidae*).

Synonymy: Shih, 1969: 16, 17.

World distribution: Atlantic 3:423; 30:133; 41:57; 43:236; 44:9; 65:23; Indian 6:186; 30:133; 41:57; Pacific 41:57; Mediterranean 41:57; 55:125.

South African records:
Shih, 1969. 23/38, 24/36, 31/30, 35/23: 300–0 m, 100–0 m and 50–0 m.
NGY Samples. 30/32, 150–0 m.
Division of Sea Fisheries IIOE Cruise I. 26/34, 300–0 m.
Division of Sea Fisheries Routine Programme Cruises, 1963. 34/16, 34/17, 35/16: 150–0 m.
As *Phronima atlantica* var. *solitaria* (Guérin Méneville, 1836), Vosseler, 1901.
Siegfried, 1963. 33/14, 5–0 m.

Remarks: A rare species known from widely separated records mainly in tropical regions. The distribution in South African waters confirms the preference for conditions of a tropical or subtropical nature.

Phronimella elongata (Claus, 1862)

Synonymy: Shih, 1969: 30, 31.

World distribution: Atlantic 3:423–424; 5:286; 11:166; 16:138; 17:187; 20:202; 30:142; 32:117; 35:70; 36:22; 41:61; 43:237–238; 44:9; 48:1370, 1371; 55:132; 65:43; Indian 6:186; 7:485; 30:142; 41:61; 44:9; 62:160–161; 69:51; Pacific 3:423–424; 27:280; 33:16; 41:61; 48:1365, 1368, 1369; Mediterranean 22:190; 41:61; 55:130–132.

South African records:
Barnard, K. H., 1940. 29/31, surface.
Siegfried, 1963. Sectors 1, 2, 3, 4.
Shih, 1969, 23/38, 24/36, 35/23: 300–0 m. 100–0 m and 50–0 m.
NGY Samples. 30/31, 30/32, 31/29, 31/30, 31/31, 32/29, 32/30, 33/27, 34/25, 34/26, 34/27, 35/26: 150–0 m and 5–0 m.
Division of Sea Fisheries IIOE Cruise I. 26/33, 26/34: 300–0 m.
Division of Sea Fisheries Routine Programme Cruises, 1963. 32/14, 32/15, 32/16, 32/17, 33/16, 34/17, 35/15, 35/16, 35/17, 35/18, 35/19, 35/20, 36/21: 150–0 m and 5–0 m.

Remarks: Like the other members of the Phronimidae this species is very widely distributed in tropical and temperate regions. In South African waters the same tolerance of widely varying oceanographic conditions is exhibited with a slight preference for warm temperate and subtropical conditions.

Family **Phrosinidae** Dana, 1852

Anchylomera blossevillei Milne-Edwards, 1830

World distribution: Atlantic 3:425; 5:288; 16:147–148; 17:180–181; 18:516; 20:200; 23:300; 32:132; 35:69; 36:22; 43:234; 44:9; 46:167; 48:1439; 55:135–136; 58:258; 65:89; Indian 6:188; 44:9; 62:160–161; 64:19; 69:52; Red Sea 45:26; Pacific 3:425; 26:18; 27:281; 29:32; 33:21; 42:42; 38:1439–1440; 62:58; Mediterranean 37:149; 55:134–135.

South African records:
Barnard, K. H., 1932. 33/16.
Siegfried, 1963. Sectors 1, 2, 4.
NGY Samples. More or less uniformly distributed in the waters off the south and east coasts of the Republic from Durban to Cape Seal: 150–0 m and 5–0 m.
Division of Sea Fisheries IIOE Cruise I. 26/33, 26/34, 26/35: 300–0 m.
Division of Sea Fisheries Routine Programme Cruises, 1963. 32/14, 32/15, 32/16, 33/16, 34/15, 34/16, 34/17, 35/15, 35/16, 35/17, 35/18, 35/19, 35/20, 36/19, 36/20, 36/21, 37/21: 150–0 m and 5–0 m.

Remarks: A common species which is very widely distributed in tropical and temperate regions. In waters off South Africa the distribution seems to be determined more by salinity-associated factors than by temperature.

Phrosina semilunata Risso, 1822

Synonymy: Shoemaker, 1945: 236.

World distribution: Atlantic 3:424; 5:287; 11:166; 16:147; 17:182–183; 20:202;

23:300; 32:133–134; 36:22; 43:236; 44:9; 46:168; 48:1429; 51:477; 55:140; 58:257; 59:24; 65:90; Indian 1:293; 6:187; 44:9; 46:168; 62:160–161; 64:19; 69:52; Red Sea 45:26; Pacific 3:424; 26:18; 27:281; 29:32; 33:23; 48:1430, 1431; Mediterranean 17:182–183; 22:190; 55:138–140.

South African records:
Spence Bate, 1862, according to Stebbing, 1910. 34/18.
Spandl, 1927. 35/19.
Barnard, K. H., 1932. 29/14, 33/16, 34/16.
Siegfried, 1963. Sectors 1, 2, 3, 4.
NGY Samples. More or less uniformly distributed in the waters off the south and east coasts of the Republic from Durban to Cape Seal: 150–0 m and 5–0 m.
Division of Sea Fisheries IIOE Cruise I. 26/34, 26/35: 300–0 m and 5–0 m.
Division of Sea Fisheries Routine Programme Cruises, 1963. 32/14, 32/15, 32/16, 33/16, 34/15, 34/16, 34/17, 35/15, 35/17, 35/18, 35/19, 36/20, 36/21, 37/18, 37/20, 37/21: 150–0 m and 5–0 m.

Remarks: The species is very common and widely distributed in tropical and temperate areas. In spite of this its distribution in waters off South Africa demonstrates that it has definite preferences for tropical and near tropical conditions.

Primno macropa Guérin Méneville, 1836

Synonymy: Shoemaker, 1945: 234.

World distribution: Atlantic 2:375; 5:288; 16:148; 17:181–182; 20:200; 23:300; 32:130–131; 36:23; 43:234–236; 44:9; 46:169; 47: charts facing 102, 103; 50:40; 55:144; 58:258; 59:25; 65:88; Indian 6:187; 28:113; 46:169; 48:1448, 1450; 62:160–161; 64:19; 69:52; Red Sea 45:25; Pacific 3:425; 4:128; 14:386–387; 25:174; 26:18; 27:280; 28:113; 29:32; 33:22; 48:1444, 1447; 61:94; 63:209; 64:19; Mediterranean 17:181–182; 22:190; 55:143–144; Antarctica 5:288.

South African records:
Barnard, K. H., 1932. 29/14, 34/16.
Siegfried, 1963. Sectors 2, 3, 4.
NGY Samples. More or less uniformly distributed in the waters off the south and east coasts of the Republic from Durban to Cape Seal: 150–0 m and 5–0 m.
Division of Sea Fisheries IIOE Cruise I. 26/33, 26/34, 26/35: 300–0 m.
Division of Sea Fisheries Routine Programme Cruises, 1963. 32/14, 33/16, 34/16, 34/17, 35/16, 35/17, 35/18, 35/19, 35/20, 36/19, 37/21: 150–0 m and 5–0 m.

Remarks: The world distribution of this species is very nearly cosmopolitan in terms of geographic range. In South African waters the species is vastly more common off the east and south coasts than off the west coast. This suggests that, in spite of its wide geographic distribution, the species prefers conditions approximating those in subtropical areas.

Family **Lycaeopsidae** Chevreux & Fage, 1925

Lycaeopsis themistoides Claus, 1879

Synonymy: Barnard, K. H., 1930: 425.

World distribution: Atlantic 3:425; 17:193; 20:201; 23:300; 32:143; 36:23; 44:9; 46:213; 56:154; Indian 23:64; 69:53; Red Sea 45:28; Pacific 3:425; 4:128; 29:32; 33:28; 48:1458; Mediterranean 22:190; 37:149; 56:154.

South African records:
Siegfried, 1963. 23/12.
NGY Samples. 32/30, 34/26, 35/26: 150–0 m and 5–0 m.

Remarks: An uncommon species which is widely distributed in tropical and temperate areas. Its greater abundance in South African waters off the south and east coasts points to a preference for tropical and subtropical conditions.

Lycaeopsis zamboangae (Stebbing, 1888)

Synonymy: Barnard, K. H., 1930: 426.

World distribution: Atlantic 3:426; 16:148; 17:195; 32:144; 46:213; 48:1454, 1461; Red Sea 45:27; Pacific 4:129; 26:20; 27:281; 33:28; 48:1454.

South African records:
NGY Samples. 34/26, 150–0 m.
Division of Sea Fisheries Routine Programme Cruises, 1963. 34/17, 5–0 m.

Remarks: An uncommon species widely distributed in tropical and temperate regions. The South African records are the first from the south-east Atlantic and south-west Indian oceans.

Family **Pronoidae** Claus, 1879

Eupronoe armata Claus, 1879

World distribution: Atlantic 3:427; 16:152; 44:9; 46:224; 56:159; 58:262; Indian 6:189; 44:9; 69:54.

South African records:
Siegfried, 1963. Sectors 1, 2, 3, 4.

Remarks: A relatively rare species known from widely separated records in tropical and temperate areas.

Eupronoe intermedia Stebbing, 1888

World distribution: Atlantic 20:200; 46:222; 48:1519.

South African records:
NGY Samples. More or less uniformly distributed in waters off the south and east coasts of South Africa from Durban to Cape Seal: 150–0 m and 5–0 m.
Division of Sea Fisheries Routine Programme Cruises, 1963. 35/15, 150–0 m.

Remarks: A rare species previously known mainly from the tropical Atlantic. It is felt that the status of the species is questionable and that re-examination of the type specimens may lead to its being united with *E. maculata*. Barnard (1930) synonymizes it with *E. armata*.

Eupronoe laticarpa Stephensen, 1926

World distribution: Atlantic 23:300; 56:161; Pacific 4:129; 33:35.

South African records:

NGY Samples. 30/31, 30/32, 31/31, 32/27, 32/29, 32/30, 33/28, 34/23, 34/26, 34/27, 35/26: 150–0 m and 5–0 m.

Remarks: A rare but distinctive species previously known from widely separated records in tropical and temperate areas. The South African records are the first from the south-western Indian ocean and point to a possible preference for tropical or subtropical conditions.

Eupronoe maculata Claus, 1879

Synonymy: Stephensen, 1926: 156.

World distribution: Atlantic 5:289; 20:201; 32:149; 36:24; 43:245; 44:9; 46:222; 48:1513; 56:156; Indian 6:188; 44:9; 64:25; Pacific 3:426; 4:129; 33:34; 48:1513; Mediterranean 37:150; 56:156.

South African records:

Siegfried, 1963. Sectors 1, 2, 3, 4.

NGY Samples. 30/31, 31/30, 32/29, 34/23, 34/25: 150–0 m.

Division of Sea Fisheries IIOE Cruise I. 26/33, 26/34: 300–0 m.

Division of Sea Fisheries Routine Programme Cruises, 1963. 32/16, 34/17, 35/15, 35/17, 35/18, 35/19, 35/21, 36/18, 36/19, 37/18, 37/21: 150–0 m and 5–0 m.

Remarks: A common species known from records in tropical and temperate areas. The NGY records are the first from waters off the south and east coasts of South Africa.

Eupronoe minuta Claus, 1879

World distribution: Atlantic 5:289; 17:197; 32:148; 36:25; 43:236; 44:9; 56:160; Indian 62:160–161; 64:25; Pacific 3:426; 14:386; 26:19; 27:281; 29:32; 33:35; 48:1517; Mediterranean 22:190; 56:160.

South African records:

Barnard, K. H., 1932. 29/14, 34/16.

Siegfried, 1963. Sectors 2, 3, 4.

NGY Samples. 30/31, 30/32, 31/29, 32/29, 32/30, 33/29, 34/25, 34/26, 34/27, 35/26: 150–0 m and 5–0 m.

Division of Sea Fisheries IIOE Cruise I. 26/35, 300–0 m.

Division of Sea Fisheries Routine Programme Cruises, 1963. 32/14, 32/15, 32/16, 33/16, 34/16, 34/17, 35/15, 35/16, 35/17, 35/18, 36/20: 150–0 m and 5–0 m.

Remarks: A widely distributed species known from tropical and temperate areas. The distribution in South African waters points to a preference for subtropical or warm temperate conditions.

Paralycaea gracilis Claus, 1879

Synonymy: Hurley, 1955: 175.

World distribution: Atlantic 32:135; 48:1571; 56:166; 59:27; Indian 48:1570; Pacific 3:427; 25:179; 26:20; 27:281; 33:30; 64:26; Mediterranean 56:165–166.

South African records:
NGY Samples. 30/32, 31/31, 33/28, 34/27: 150–0 m and 5–0 m.
Division of Sea Fisheries Routine Programme Cruises, 1963. 32/15, 33/16, 34/16: 150–0 m and 5–0 m.

Remarks: An uncommon but widely distributed species known from records in tropical and temperate regions. The distribution in South African waters suggests a preference for subtropical or warm temperate conditions.

Parapronoe crustulum Claus, 1879

Synonymy: Shoemaker, 1945: 246.

World distribution: Atlantic 5:290; 16:152; 17:200; 32:150, 152; 36:24; 43:246; 44:9; 46:220; 48:1532; 51:479; 56:165; Indian 1:294; 6:189; 44:9; 48:1529; 69:54; Pacific 3:427; 27:281; 33:32; 48:1526, 1530; 64:25.

South African records:
Siegfried, 1963. Sectors 1, 2, 3.
NGY Samples. 35/26, 150–0 m.
Division of Sea Fisheries Routine Programme Cruises, 1962, 1963. 32/16, 34/16, 34/16, 34/17, 36/21, 37/18, 37/21: 150–0 m and 5–0 m.
As *Parapronoe campbelli* Stebbing, 1888, Siegfried, 1963. Sectors 2, 3, 4.
As *Parapronoe clausi* Stebbing, 1888, Barnard K. H., 1916. 33/28.
As *Amphipronoe cuspidata* Spence Bate, 1862, Spence Bate, 1862, according to Stebbing, 1910. 34/18.

Remarks: A relatively uncommon species which is widely distributed in tropical and temperate areas. The distribution in South African waters points to a slight preference for temperate conditions.

Pronoe capito Guérin Méneville, 1836

World distribution: Atlantic 5:289; 17:197; 32:147; 36:25; 46:217; 48:1509; Indian 6:188; 69:54; Red Sea 45:34; Pacific 48:1509.

South African records:
NGY Samples. 33/28, 150–0 m.
Division of Sea Fisheries IIOE Cruise I. 26/33, 300–0 m.

Remarks: A relatively rare species known mainly from records in tropical areas. The South African records are the first from the south-west Indian ocean and point to a preference for subtropical or tropical conditions.

Sympronoe parva (Claus, 1879)

Synonymy: Shoemaker, 1945: 246.

World distribution: Atlantic 5:291; 20:203; 32:152; 35:70; 36:23; 43:246; 44:9; 46:225; 48:1537; 56:162; Indian 6:190; 31:62; 69:54; Pacific 3:427; 4:129; 26:19; 27:281; 29:32; 33:33; 42:42; 48:1537; Mediterranean 56:162.

South African records:
Siegfried, 1963. Sectors 2, 3, 4.
NGY Samples. 30/31, 32/30, 34/23, 34/25, 34/26: 150–0 m and 5–0 m.
Division of Sea Fisheries Routine Programme Cruises, 1962, 1963. 33/16, 33/17, 34/17, 35/18: 150–0 m and 5–0 m.

Remarks: A widely distributed species known from records in tropical and temperate regions. The distribution in South African waters suggests a preference for subtropical or warm temperate conditions.

Family **Lycaeidae** Claus, 1879

Lycaea nasuta Claus, 1887

World distribution: Atlantic 5:291; 44:10; Pacific 3:430; Indian type locality.

South African records:
Barnard, K. H., 1932. 34/16.
Siegfried, 1963. Sectors 2, 3.

Remarks: Although the type locality is off Zanzibar the species has not been recorded since from the Indian ocean, all of the later records being from the Atlantic. In view of this and the general state of confusion in the taxonomy of species of *Lycaea*, it is highly desirable that the type specimen be re-examined since the figures given by Barnard (1930) are totally inadequate.

Lycaea pulex Marion, 1874

Synonymy: Shoemaker, 1945: 243.

World distribution: Atlantic 3:429; 16:156–157; 20:201; 32:137, 138; 36:25; 43:243; 48:1565, 1567; 56:168, 169; 58:262; Indian 6:190; 31:63; 69:54; Red Sea 45:30; Pacific 3:430, 431; 4:129–130; 26:21; 27:282; 29:32; 33:24; 42:46; Mediterranean 56:167–168, 168–169, 169.

South African records:
NGY Samples. 32/30, 33/27, 34/23, 34/25: 150–0 m and 5–0 m.
Division of Sea Fisheries IIOE Cruise I. 26/33, 26/34: 300–0 m.
Division of Sea Fisheries Routine Programme Cruises, 1963. 33/15, 33/16, 34/16, 34/17, 34/19, 35/18, 35/19, 35/20, 36/18, 36/21: 150–0 m and 5–0 m.

Remarks: This widely distributed species is known under various synonyms from tropical and temperate regions. In South African waters the distribution points to a high degree of tolerance to varying oceanographic conditions.

Lycaea serrata Claus, 1879

World distribution: Atlantic 43:243; Indian type locality; Mediterranean 56:168.

South African records:
Division of Sea Fisheries Routine Programme Cruises, 1963. 32/16, 35/17, 35/18: 150–0 m.

Remarks: A rare but distinctive species known from widely separated records in tropical and temperate regions. The South African records are the first from the south-eastern Atlantic.

Pseudolycaea pachypoda Claus, 1879

World distribution: Atlantic 16:160; 20:203; 32:139; 35:70; 46:216; Indian 64:24; Mediterranean 22:190; 56:169–170.

South African records:
Division of Sea Fisheries Routine Programme Cruises, 1963. 33/16, 34/17, 35/15: 150–0 m and 5–0 m.

Remarks: A relatively rare species known from records in tropical and temperate regions. It is new to the list of hyperiids from the south-eastern Atlantic.

Tryphana malmii Boeck, 1870

Synonymy: Shoemaker, 1945: 243.

World distribution: Atlantic 16:153; 32:136; 38:18; 43:243; 44:9; 48:1542; 56:171; 59:25; 60:21; Indian 44:9; 64:24; Pacific 3:428; 64:24.

South African records:
Siegfried, 1963. Sectors 1, 2, 3, 4.
Division of Sea Fisheries Routine Programme Cruises, 1963. 33/16, 34/16, 34/17: 150–0 m and 5–0 m.

Remarks: An uncommon but widely distributed species known mainly from records in temperate areas. The South African records are all located in areas which experience the influx of Atlantic waters.

Family **Brachyscelidae** Stephensen, 1923

Brachyscelus crusculum Spence Bate, 1861

Synonymy: Shoemaker, 1945: 243.

World distribution: Atlantic 3:432; 5:292; 16:153, 154; 17:196–197; 20:200; 32:140; 36:26; 40:223; 43:242; 44:10; 46:210; 48:1557; 50:41; 56:173; 58:262; 59:26; Indian 44:10; 62:160–161; 64:23; 69:54; Red Sea 45:32; Pacific 3:432; 24:490; 27:282; 29:32; 33:25–26; 41:45–46; 48:1547, 1548; Mediterranean 39:5–8; 56:172–173.

South African records:
Barnard, K. H., 1932. 33/16, 34/16.
Siegfried, 1963. Sectors 1, 2, 3, 4.
NGY Samples. More or less uniformly distributed in the waters off the south and east coasts of South Africa from Durban to Cape Seal: 150–0 m and 5–0 m.
Division of Sea Fisheries IIOE Cruise I. 26/33, 26/34, 26/35: 300–0 m.

Division of Sea Fisheries Routine Programme Cruises, 1963. 34/16, 34/17, 35/15, 35/18, 35/19, 36/18, 36/19: 150–0 m and 5–0 m.

Remarks: A very widely distributed species known from both tropical and temperate areas. The distribution in South African waters points to a preference for subtropical or warm temperate conditions. The species within the genus are not, in many cases, adequately described and illustrated and Spence Bate's drawings of the type of this, the most common species, are totally inadequate. A revision of the genus is urgently required.

Brachyscelus rapacoides Stephensen, 1926

World distribution: Atlantic 35:70; 36:26; Indian 64:24; Pacific 3:432; 33:27; Mediterranean 56:179.

South African records:
NGY Samples. 31/29, 31/30, 34/25: 150–0 m and 5–0 m.
Division of Sea Fisheries IIOE Cruise I. 26/33, 26/34: 300–0 m.

Remarks: A rare species known from widely separated records in tropical and temperate areas. The distribution in South African waters seems to indicate a slight preference for tropical or subtropical conditions.

Brachyscelus rapax (Claus, 1871)

Synonymy: Stephensen, 1926: 250.

World distribution: Atlantic 5:291; type locality.

South African records:
Claus, 1871, according to Stebbing, 1910. 34/18.

Remarks: This species has only been recorded from the South Atlantic. Its status must remain doubtful until the type specimen(s) is re-examined and its relation to the other species of the genus clarified.

Thamneus platyrrhynchus Stebbing, 1888

Synonymy: Barnard, K. H., 1932: 293.

World distribution: Atlantic 5:293; 16:154; 17:197; 32:154; 44:10; 46:210; 56:180; Indian 6:191; 69:54; Pacific 48:1562; Mediterranean 56:180.

South African records:
Siegfried, 1963. Sector 4.
Division of Sea Fisheries Routine Programme Cruises, 1962, 1963. 34/17, 35/20: 150–0 m and 5–0 m.

Remarks: A relatively uncommon but widely distributed species known from records in tropical and temperate areas. The distribution in South African waters seems to be linked to waters of Atlantic origin.

Family **Oxycephalidae** Spence Bate, 1862

Calamorhynchus pellucidus Streets, 1878

Synonymy: Fage, 1960: 31.

World distribution: Atlantic 3:434; 17:202; 21:31; 32:164; 43:251; 46:198, 200; 48:1602; 51:481; 56:190; Indian 21:31; Pacific 3:434; 14:387; 21:31; 34:371; Mediterranean 21:31; 56:190.

South African records:
Fage, 1960. 24/38, 25/36, 34/27: 300–0 m, 200–0 m, 150–0 m and 50–0 m.
NGY Samples. 34/26: 100–0 m.
Division of Sea Fisheries Routine Programme Cruises, 1962. 33/16, 150–0 m.

Remarks: An uncommon but widely distributed species recorded from tropical and temperate areas. The distribution in South African waters suggests a fairly high degree of tolerance to widely varying oceanographic conditions.

Cranocephalus scleroticus (Streets, 1878)

Synonymy: Fage, 1960: 72.

World distribution: Atlantic 21:72; 32:167; 35:80; 36:30; 43:251–253; 46:193; 56:199; Indian 21:72; 69:55; Pacific 21:72; 27:282; 34:370; Mediterranean 17:202; 21:72; 56:199.

South African records:
Fage, 1960. 25/36, 29/32, 36/21: 200–0 m and 100–0 m.
Division of Sea Fisheries IIOE Cruise I. 26/33, 26/34: 300–0 m.

Remarks: A widely distributed but relatively uncommon species that is known mainly from tropical areas. The distribution in South African waters seems to confirm the preference for tropical conditions.

Glossocephalus milne-edwardsi Bovallius, 1887

Synonymy: Fage, 1960: 83.

World distribution: Atlantic 21:87; 35:79; 43:253; 46:196; Indian 6:193; 7:485; 19:221; 21:87; 69:237; Pacific 4:131–132; 21:87; 34:371; Mediterranean 21:87; 17:200.

South African records:
Barnard, K. H., 1940. 29/31, surface.
Fage, 1960. 24/38, 34/27, 35/23: 300–0 m, 250–0 m and 50–0 m.

Remarks: The species is known mainly from the tropical areas of the oceans. The *Dana* expeditions found it to be most abundant in the Indian ocean. The records from South African waters tend to confirm a preference for tropical conditions.

Leptocotis tenuirostris (Claus, 1871)

Synonymy: Fage, 1960: 37.

World distribution: Atlantic 3:435; 5:296; 17:163; 21:40; 32:168; 36:28; 43:253–255; 46:203, 204, 205; 56:191; 58:264; Indian 6:194; 19:217–218; 31:40; 62:160–161; 69:55; Pacific 3:435; 4:132; 19:217–218; 21:40; 27:282; 29:32; 34:372; 48:1596; 62:58.

South African records:
Fage, 1960. 24/33, 25/36, 29/31, 31/30, 34/27, 35/23, 36/21: 300–0 m and 100–0 m.
NGY Samples. 30/31, 30/32, 31/29, 31/30, 32/29, 32/30, 33/27, 33/28, 34/23, 34/25, 34/26, 34/27, 35/26: 150–0 m and 5–0 m.
Division of Sea Fisheries IIOE Cruise I. 26/33, 26/34: 300–0 m.
Division of Sea Fisheries Routine Programme Cruises, 1963. 35/17, 150–0 m.

Remarks: A very widely distributed species known mainly from tropical areas. The tropical nature of the species is emphasized by the distribution in South African waters being biased in favour of the waters off the south and east coasts.

Oxycephalus clausi Bovallius, 1887

Synonymy: Fage, 1960: 20.

World distribution: Atlantic 3:433; 5:294; 7:485; 16:161; 17:200; 18:516; 21:21; 32:163; 36:29; 43:251; 44:10; 46:181; 48:1582; 56:189; Indian 6:192; 7:485; 19:212; 21:21; 31:65; 44:10; 52:11; 69:55; Red Sea 15:5, 6, 7; Pacific 4:130; 14:387; 21:21; 34:367; 48:1584; Mediterranean 56:189.

South African records:
Stebbing, 1924. 29/31.
Barnard, K. H., 1932. 33/16.
Barnard, K. H., 1940. 29/31, 33/25, 34/18: surface.
Fage, 1960. 24/38, 25/36, 29/31, 29/32, 30/33, 31/30, 35/23, 36/21: 300–0 m, 200–0 m and 100–0 m.
Siegfried, 1963. Sectors 1, 2, 3, 4.
NGY Records. More or less uniformly distributed in the waters off the south and east coasts of South Africa from Durban to Cape Seal: 150–0 m and 5–0 m.
Division of Sea Fisheries IIOE Cruise I. 26/32, 26/33, 26/34, 26/35, 26/36: 300–0 m and 5–0 m.
Division of Sea Fisheries Routine Programme Cruises, 1962, 1963. 32/14, 32/16, 33/15, 33/16, 34/15, 34/17, 35/15, 35/16, 35/17, 35/19, 35/21, 36/18, 36/21, 37/21: 150–0 m and 5–0 m.
As *Oxycephalus tuberculatus* Spence Bate, 1862. Spence Bate, 1862, according to Stebbing, 1910. 34/18.

Remarks: A very widely distributed species known from tropical and temperate regions. The distribution in South African waters confirms the wide tolerances of the species. In the NGY samples the species was most abundant in the upper five metres of the water strata.

Oxycephalus latirostris Claus, 1879

Synonymy: Fage, 1960: 26.

World distribution: Atlantic 21:26; 44:10; Indian 7:485; 21:26; Pacific 21:26; 34:367; Red Sea 45:32.

South African records:

Barnard, K. H., 1940. 29/31, surface.

Fage, 1960. 24/38, 25/36, 29/31, 34/27, 35/23: 300–0 m, 250–0 m, 200–0 m and 100–0 m.

Siegfried, 1963. 32/13, 150–0 m.

NGY Samples. 32/30, 34/23, 34/25: 150–0 m.

Remarks: An uncommon species known from widely separated records, mainly in tropical areas. The distribution in South African waters, biased in favour of south and east coast waters, tends to confirm the preference for tropical conditions.

Oxycephalus piscator Milne-Edwards, 1830

Synonymy: Fage, 1960: 14.

World distribution: Atlantic 5:294; 16:160; 20:201; 21:14; 32:163; 36:29; 43:246–251; 46:180; 56:187; Indian 21:14; Pacific 3:433; 21:14; Mediterranean 21:14; 56:187.

South African records:

Fage, 1960. 24/38, 25/36, 27/33, 34/27, 35/23: 300–0 m, 200–0 m, 100–0 m and 50–0 m.

NGY Samples. 30/32, 33/28: 150–0 m.

Division of Sea Fisheries IIOE Cruise I. 26/33, 26/34, 26/35: 300–0 m and 5–0 m.

Division of Sea Fisheries Routine Programme Cruises, 1963. 35/15, 35/16, 35/18: 150–0 m.

Remarks: A relatively uncommon though widely distributed species known mainly from records in tropical regions. The slightly biased distribution in South African waters tends to support a preference for tropical conditions.

Rhabdosoma brevicaudatum Stebbing, 1888

Synonymy: Fage, 1960: 104.

World distribution: Atlantic 3:436; 16:163; 17:203; 20:203; 21:108; 43:255; 48:1614; Indian 62:160–161; Pacific 21:108; 29:32; Mediterranean 21:108; 56:205.

South African records:

Division of Sea Fisheries IIOE Cruise I. 26/34, 300–0 m.

Division of Sea Fisheries Routine Programme Cruises, 1963. 34/17, 150–0 m.

Remarks: This relatively uncommon species appears for some unknown (? biological) reason to be confined mainly to the tropical areas of the Atlantic and Pacific oceans. The IIOE record is the first from the south-west Indian ocean and the Indian ocean as a whole.

Rhabdosoma minor Fage, 1954

World distribution: Atlantic 21:108; Indian 21:108; Pacific 21:108.

South African records:
Fage, 1960. 24/38, 25/36, 28/33, 29/31, 34/27, 36/21: 300–0 m, 200–0 m and 100–0 m.
NGY Samples. 30/31, 34/25: 150–0 m.

Remarks: This species is known almost exclusively from the records of the *Dana* expeditions (Fage, 1960). Its distribution is centred on the Indian ocean, mainly in the tropical areas.

Rhabdosoma whitei Spence Bate, 1861

Synonymy: Fage, 1960: 6.

World distribution: Atlantic 3:436; 5:296; 17:203; 20:203; 21:102; 36:31; 43:255; 44:10; 46:209; 49:370; 56:207; Indian 6:193; 7:486; 21:102; 44:10; 46:209; 69:55; Pacific 4:132; 32:222; 21:102; 27:282; 34:373; Mediterranean 21:102.

South African records:
Barnard, K. H., 1940. 29/31, surface.
Fage, 1960. 25/36, 29/31, 35/23: 200–0 m, 100–0 m and 50–0 m.
Siegfried, 1963. Sectors 1, 2, 3, 4.
NGY Samples. 34/23, 34/25: 150–0 m and 5–0 m.
Division of Sea Fisheries IIOE Cruise I. 26/33, 26/34: 300–0 m.
Division of Sea Fisheries Routine Programme Cruises, 1963. 33/16, 34/17, 35/17, 35/19, 36/19: 150–0 m and 5–0 m.

Remarks: This, the most common of the species of *Rhabdosoma*, is very widely distributed but recorded mainly from tropical and subtropical areas. In South African waters the species is widely distributed but is not common enough to permit amplification of the above statements.

Simorhynchotus antennarius (Claus, 1871)

Synonymy: Fage, 1960: 11.

World distribution: Atlantic 3:433; 17:160; 21:11; 23:300; 32:161; 36:28; 44:10; 46:211; 48:1575; 56:185; Indian 6:191; 21:11; 31:64; 44:10; Pacific 3:433; 4:130; 21:11; 54:366; Mediterranean 21:11; 56:185.

South African records:
Siegfried, 1963. Sectors 1, 2, 3, 4.
NGY Samples. 30/32, 32/29, 33/23, 34/23, 34/25, 35/26: 150–0 m.
Division of Sea Fisheries IIOE Cruise I. 26/34, 300–0 m.
Division of Sea Fisheries Routine Programme Cruises, 1963. 33/15, 34/17, 35/18, 35/19, 35/20, 36/18: 150–0 m and 5–0 m.

Remarks: A widely distributed species apparently with a high degree of tolerance to varying oceanographic conditions, many of the records coming from tropical areas. In South African waters the distribution is decidedly biased in favour of areas influenced by tropical and subtropical oceanographic conditions.

Streetsia challengeri Stebbing, 1888

Synonymy: Fage, 1960: 51.

World distribution: Atlantic 3:435; 5:295; 16:161; 17:203; 21:51; 32:165, 166; 43:255; 44:10; 46:184, 187; 56:195; 58:263; Indian 6:192; 7:486; 19:219; 21:51; 69:55; Pacific 3:435; 14:387–388; 21:51; 26:19; 34:369; 48:1606; Mediterranean 17:203; 21:51; 56:194–195.

South African records:

Barnard, K. H., 1932. 29/14, 200–0 m.

Fage, 1960. 24/38, 25/36, 28/33, 29/31, 29/32, 34/27, 35/23, 31/14: 300–0 m, 250–0 m, 200–0 m and 100–0 m.

NGY Samples. 30/32, 31/29, 31/31, 33/27, 35/26: 150–0 m.

Division of Sea Fisheries IIOE Cruise I. 26/34, 300–0 m.

Division of Sea Fisheries Routine Programme Cruises, 1962, 1963. 32/16, 34/16, 34/17, 35/15: 150–0 m and 5–0 m.

As *Streetsia pronoides* (Bovallius, 1887). Barnard, K. H., 1940. 29/31, surface. Siegfried, 1963. Sectors 2, 3, 4.

Remarks: A very common and widely distributed species whose abundance has been grossly underestimated if the records of the *Dana* expeditions are considered. The bias in the world distribution in favour of tropical areas is duplicated to some extent by the distribution in South African waters.

Streetsia mindanaonis (Stebbing, 1888)

Synonymy: Fage, 1960: 45.

World distribution: Atlantic 21:49; Indian 21:49; Pacific 21:49; 48:1599.

South African records:

Fage, 1960. 24/38, 28/33, 29/31: 300–0 m, 200–0 m and 100–0 m.

NGY Samples. 30/32, 32/30, 34/25, 35/26: 150–0 m and 5–0 m.

Remarks: A rare but widely distributed, distinctive species known from records in tropical and temperate regions. In South African waters it exhibits a remarkable distribution, failing to penetrate waters west of Cape Agulhas. Further information on the species is required before this can be explained.

Streetsia porcella (Claus, 1879)

Synonymy: Fage, 1960: 63.

World distribution: Atlantic 3:435; 5:295; 21:63; 32:166; 36:29; 43:255; 46:188; 56:193; Indian 6:192; 21:63; 62:160–161; Pacific 3:435; 21:63; 27:282; 29:32; 34:370; 48:1589; 62:58; Mediterranean 21:63; 56:192–193.

South African records:

Fage, 1960. 24/38, 25/36, 28/33: 200–0 m and 50–0 m.

NGY Samples. 30/31, 150–0 m.

Division of Sea Fisheries IIOE Cruise I. 26/35, 300–0 m.

Division of Sea Fisheries Routine Programme Cruises, 1963. 37/21, 5–0 m.

Remarks: A relatively uncommon species which is widely distributed, mainly in tropical regions. Like the previous species its distribution in South African waters is biased in favour of areas east of Cape Agulhas, suggesting a preference for tropical conditions although the abundance is not great enough to provide proof of this.

Streetsia steenstrupi (Bovallius, 1887)

Synonymy: Fage, 1960: 42.

World distribution: Atlantic 5:296; 21:45; 44:10; Indian 21:45; Pacific 21:45; 48:1593.

South African records:
Fage, 1960. 29/32, 31/30, 34/27, 35/23, 31/14: 300–0 m, 200–0 m and 100–0 m.
Siegfried, 1963. Sectors 2, 3, 4.
NGY Samples. 30/32, 32/30, 34/27: 150–0 m and 5–0 m.
Division of Sea Fisheries Routine Programme Cruises, 1963. 32/16, 34/16, 35/17, 37/21: 150–0 m and 5–0 m.

Remarks: A rare but widely distributed species that has been recorded mainly from tropical areas. In South African waters the distribution appears to indicate a preference for subtropical rather than tropical conditions.

Family **Parascelidae** Bovallius, 1887

Parascelus edwardsi Claus, 1879

Synonymy: Shoemaker, 1945: 260.

World distribution: Atlantic 20:202; 35:72; 36:31–32; 43:260; 44:10; 46:264; 56:211; Indian 44:10; 62:160–161; Red Sea 45:42; Pacific 4:132; 29:32; 33:36; 42:46; 48:1500; 62:48, 58; Mediterranean 56:211.

South African records:
Siegfried, 1963. Sectors 1, 2, 3, 4.
NGY Samples. 30/31, 30/32, 32/29, 33/29, 34/23, 34/25, 34/26: 150–0 m and 5–0 m.
Division of Sea Fisheries IIOE Cruise I. 26/32, 26/35: 300–0 m and 5–0 m.
Division of Sea Fisheries Routine Programme Cruises, 1963. 33/15, 34/17, 35/17, 35/18, 35/19, 36/19, 36/20, 37/21: 150–0 m and 5–0 m.

Remarks: A relatively uncommon but widely distributed species known from records in tropical and temperate areas. The distribution in South African waters confirms the high degree of tolerance of the species to widely varying oceanographic conditions.

Parascelus typhoides Claus, 1879

World distribution: Atlantic 5:299; 16:151; 43:260; 46:262; Indian 62:160–161; Red Sea 45:43; Pacific 25:186; 26:21; 27:282; 29:32; Mediterranean 56:211.

South African records:
NGY Samples. More or less uniformly distributed in the waters off the south and east coasts of South Africa from Durban to Cape Seal: 150–0 m and 5–0 m.
Division of Sea Fisheries IIOE Cruise I. 26/34, 26/35: 300–0 m.
Division of Sea Fisheries Routine Programme Cruises, 1963. 32/14, 33/15, 33/16, 34/16, 34/17, 35/17, 35/18, 35/19, 37/18, 37/21: 150–0 m and 5–0 m.

Remarks: Like the previous species this species is widely distributed but relatively uncommon. It is recorded from tropical and temperate areas. The distribution in South African waters confirms that it is highly tolerant of widely varying oceanographic conditions.

Schizoscelus ornatus Claus, 1879

World distribution: Atlantic 16:151; 36:33; 56:208; 58:261; Indian 44:11; Pacific 48:1506; Mediterranean 56:208.

South African records:
Siegfried, 1963. 34/19, 5–0 m.
NGY Samples. 29/31, 30/31, 32/30, 34/25: 5–0 m.
Division of Sea Fisheries IIOE Cruise I. 26/33, 300–0 m.
Division of Sea Fisheries Routine Programme Cruises, 1963. 33/18, 36/20: 5–0 m.

Remarks: A rare species known from records in tropical and temperate regions. The South African records are remarkable in that, with the exception of the IIOE record, they all were taken in surface tows. The records also suggest a preference for subtropical and tropical conditions.

Thyropus sphaeroma (Claus, 1879)

Synonymy: Shoemaker, 1945: 260.

World distribution: Atlantic 3:437; 5:299; 36:33; 43:260; 44:11; 46:259; 48:1495; Indian 6:197; 44:11; Pacific 27:282; 33:36.

South African records:
Siegfried, 1963. Sectors 1, 2, 3, 4.
NGY Samples. 29/31, 30/30, 30/32, 31/29, 31/30, 32/30, 34/23, 34/25, 34/26, 35/26: 150–0 m and 5–0 m.
Division of Sea Fisheries Routine Programme Cruises, 1963. 34/18, 35/18: 150–0 m and 5–0 m.

Remarks: An uncommon species known from widely separated records in temperate and tropical areas. The species is widely distributed in South African waters, suggesting a fair degree of tolerance to varying oceanographic conditions. A preference for waters of subtropical origin is indicated by the pattern of distribution.

Family **Platyscelidae** Spence Bate, 1862

Amphithyrus bispinosus Claus, 1879

Synonymy: Spandl, 1927: 247.

World distribution: Atlantic 3:438; 16:150–151; 32:159; 35:72; 36:33; 43:259; 44:11; 46:247; 48:1491; 56:225; Indian 6:196; Pacific 3:438; 27:283; 33:44; Mediterranean 56:225.

South African records:
Siegfried, 1963. 34/17, 5–0 m.
NGY Samples. 30/30, 30/31, 30/32, 31/29, 31/30, 32/28, 32/29, 32/30, 33/28, 34/23, 34/25, 34/27, 35/26: 150–0 m and 5–0 m.
Division of Sea Fisheries IIOE Cruise I. 26/33, 300–0 m.
Division of Sea Fisheries Routine Programme Cruises, 1963. 34/16, 35/15, 35/17, 36/21, 37/18, 37/21: 150–0 m.

Remarks: A widely distributed species recorded mainly from the warmer areas of the oceans. The distribution in South African waters is decidedly biased in favour of waters off the south and east coasts, suggesting a preference for tropical and subtropical conditions.

Amphithyrus glaber Spandl, 1924

World distribution: Atlantic 3:438; 35:72; Red Sea 45:40; Pacific 27:283; 33:45.

South African records:
NGY Samples. 30/30, 30/31, 30/32, 31/29, 32/27, 32/29, 32/30, 34/23, 34/25, 34/26: 150–0 m and 5–0 m.
Division of Sea Fisheries IIOE Cruise I. 26/33, 26/34: 300–0 m and 5–0 m.
Division of Sea Fisheries Routine Programme Cruises, 1963. 33/15, 33/16, 34/16, 35/15, 35/18, 35/19, 37/21: 150–0 m.

Remarks: A rare species known from widely separated records, mainly in tropical areas. Like the previous species, its distribution in South African waters is biased in favour of areas influenced by waters of tropical and subtropical origin.

Amphithyrus sculpturatus Claus, 1879

Synonymy: Spandl, 1927: 250.

World distribution: Atlantic 32:158; 36:34; 44:11; 56:226; Indian 6:196; 44:11; Pacific 33:44–45; 42:58; 48:1488; Mediterranean 56:226.

South African records:
Siegfried, 1963. Sectors 1, 2, 3.
NGY Samples. 30/31, 30/32, 32/29, 32/30, 34/23, 34/25, 34/27: 150–0 m and 5–0 m.
Division of Sea Fisheries IIOE Cruise I. 26/33, 300–0 m and 5–0 m.
Division of Sea Fisheries Routine Programme Cruises, 1963. 33/16, 34/17, 34/19, 35/18, 35/19: 150–0 m and 5–0 m.

Remarks: An uncommon but widely distributed species recorded mainly from tropical areas. The relationship between this species and the closely related *glaber* has not been clearly defined and has led to the latter being given subspecific rank. In the opinion of the present author, the constant characteristics of the fourth pereiopod of *A. glaber* demonstrated by the present study justify its retention of specific rank.

The distribution in South African waters confirms the preference for subtropical and tropical conditions common to species of *Amphithyrus*.

Amphithyrus similis Claus, 1879

Synonymy (discussed): Spandl, 1927: 250.

World distribution: Atlantic 43:259; 56:225; Red Sea 45:39; Mediterranean 56:225.

South African records:
NGY Samples. 30/31, 150–0 m.
Division of Sea Fisheries IIOE Cruise I. 26/33, 26/34: 300–0 m and 5–0 m.
Division of Sea Fisheries Routine Programme Cruises, 1963. 33/17, 34/16, 34/17, 35/15: 150–0 m and 5–0 m.

Remarks: A very rare but distinctive species known mainly from subtropical areas. The abundance in South African waters does not furnish proof of any particular preferences but the distribution suggests a reasonable degree of tolerance to varying oceanographic conditions and a possible preference for subtropical conditions.

Hemityphis rapax (Milne-Edwards, 1830)

Synonymy: Shoemaker, 1945: 259.

World distribution: Atlantic 5:299; 16:149; 20:201; 32:160; 35:71; 36:35; 43:259; 44:11; 46:233, 237; 48:1475; 51:478; 56:220; 58:259; Indian 6:195; 48:1475; 69:53; Pacific 3:437; 33:38; 64:26; Mediterranean 56:220.

South African records:
Barnard, K. H., 1932. 34/16.
Siegfried, 1963. Sectors 2, 3, 4.
NGY Samples. 29/31, 30/31, 30/32, 31/31, 32/29, 32/30, 34/26, 34/27, 35/26: 150–0 m and 5–0 m.
Division of Sea Fisheries Routine Programme Cruises, 1963. 32/14, 32/15, 32/16, 33/16, 34/16, 34/17, 35/15, 35/18, 35/19, 36/18, 37/18: 150–0 m and 5–0 m.
As *Hemityphis tenuimanus* Claus, 1879. Claus, 1879 according to Stebbing, 1910. 34/18.

Remarks: A very widely distributed species known from temperate and tropical areas. The same wide tolerances are reflected in the distribution in South African waters.

Paratyphis maculatus Claus, 1879

Synonymy: Shoemaker, 1945: 259.

World distribution: Atlantic 3:439; 16:150; 35:72; 36:36; 43:260; 44:11; 51:478; 56:223; 58:259; Indian 6:195; Pacific 3:439; 27:283; 33:39.

South African records:
Claus, 1879 according to Stebbing, 1910. 34/18.
Siegfried, 1963. Sectors 2, 3.
NGY Samples. 30/31, 30/32, 31/30, 31/31, 32/29, 32/30, 33/28, 34/25, 35/26: 150–0 m and 5–0 m.
Division of Sea Fisheries Routine Programme Cruises, 1963. 33/15, 34/17, 35/15, 35/16, 35/18, 35/19: 150–0 m and 5–0 m.

Remarks: A relatively uncommon species which is widely distributed in temperate and tropical areas. The distribution in South African waters suggests that the preferences of the species lie nearer to the subtropical–warm temperate rather than the tropical range of oceanographic conditions.

Paratyphis promontorii Stebbing, 1888

World distribution: Atlantic 20:202; 32:157; 48:1478; 56:223.

South African records:
Stebbing, 1888. 35/18, surface.
NGY Samples. 30/31, 31/30, 31/31, 32/30, 33/28, 34/23, 34/25, 34/26, 35/26: 150–0 m and 5–0 m.
Division of Sea Fisheries Routine Programme Cruises, 1963. 33/16, 34/16, 34/17, 35/15, 35/19, 36/18, 36/19: 150–0 m and 5–0 m.

Remarks: A rare species previously only recorded from the Atlantic in tropical and temperate areas. The NGY records are the first from the Indian ocean.

A preference for waters of subtropical origin is suggested by the distribution pattern of the species in South African waters.

Paratyphis spinosus Spandl, 1924

World distribution: Atlantic 20:202; 36:36; Red Sea 45:36; Pacific 3:439; 33:40; Mediterranean 56:221.

South African records:
NGY Samples. 32/29, 32:30, 34/23, 35/25, 35/26: 150–0 m.

Remarks: A rare species known mainly from widely separated records in tropical and subtropical regions. There is no doubt (as Barnard (1930) suggested) that *P. clausii* Stephensen, 1926 is synonymous with this species.

The NGY records are the first from South African waters and the southwest Indian ocean in particular.

Platyscelus ovoides (Claus, 1879)

Synonymy: Shoemaker, 1945: 256.

World distribution: Atlantic 5:297; 17:200; 32:157; 36:36; 43:256; 44:11; 46:228; 56:213–214, 218; 59:25; Indian 6:194; 62:160–161; 69:54; Pacific 25:192; 27:283; Mediterranean 17:200; 56:213, 218.

South African records:
Barnard, K. H., 1932. 34/16.
Siegfried, 1963. Sectors 2, 3, 4.

NGY Samples. 30/32, 31/30, 34/25, 34/26, 35/26: 150–0 m and 5–0 m.
Division of Sea Fisheries IIOE Cruise I. 26/34, 300–0 m.
Division of Sea Fisheries Routine Programme Cruises, 1963. 33/15, 37/21: 150–0 m.

Remarks: A widely distributed though not very common species, recorded mainly from tropical areas. Although not common in South African waters, the species exhibits a marked degree of tolerance to varying oceanographic conditions.

Platyscelus serratulus Stebbing, 1888

Synonymy: Shoemaker, 1945: 259.

World distribution: Atlantic 5:298; 16:149; 17:200; 20:203; 35:71; 36:37; 43:259; 44:11; 48:1470; 56:216; Indian 44:11; 62:160–161; Red Sea 45:35; Pacific 3:437; 14:385–386; 26:22; 27:283; 29:32; 33:37; 42:51; Mediterranean 37:149; 56:215–216.

South African records:
Siegfried, 1963. Sectors 1, 2, 3, 4.
NGY Samples. 33/28, 35/26: 5–0 m.
Division of Sea Fisheries Routine Programme Cruises, 1963. 32/14, 32/16, 33/16, 34/17, 35/17, 35/18: 150–0 m and 5–0 m.

Remarks: Like the previous species, the world distribution of this species is biased in favour of tropical and subtropical areas. Although not common in South African waters, the species exhibits a preference for waters of subtropical character.

Tetrathyrus forcipatus Claus, 1879

Synonymy: Shoemaker, 1945: 259.

World distribution: Atlantic 3:439; 16:150; 20:203; 35:72; 36:34–35; 43:259; 44:11; 46:241; 48:1485; 51:478; 56:224; Indian 6:195; 44:11; 48:1483; Red Sea 45:38; Pacific 3:439; 4:133; 29:32; 33:42–43; 42:54; 48:1483, 1484; Mediterranean 56:224.

South African records:
Claus, 1879 according to Stebbing, 1910. 34/18.
Siegfried, 1963. Sectors 1, 2, 3, 4.
NGY Samples. 30/31, 32/30, 34/23, 34/25, 34/26, 35/26: 150–0 m and 5–0 m.
Division of Sea Fisheries IIOE Cruise I. 26/33, 300–0 m.
Division of Sea Fisheries Routine Programme Cruises, 1963. 33/15, 33/16, 34/16, 34/17, 35/18, 35/19, 35/20: 150–0 m and 5–0 m.

Remarks: A very widely distributed species known mainly from tropical and subtropical areas. In South African waters the species is most abundant in waters of a subtropical character.

Summary

Keys to the genera and species, and a distribution list of the 105 recorded species of South African hyperiid Amphipoda, have been compiled. Twenty-six species are new records from South African waters, 20 are additions to the west coast fauna, 45 are additions to the south coast fauna and 39 are additions to the east coast fauna.

The majority of species represented are those that have preferences for oceanographic conditions of a tropical or subtropical nature.

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Key to Authors' Numbers used in World Distribution Records

1. Barnard, K. H. 1916.
2. Barnard, K. H. 1925.
3. Barnard, K. H. 1930.
4. Barnard, K. H. 1931.
5. Barnard, K. H. 1932.
6. Barnard, K. H. 1937.
7. Barnard, K. H. 1940.
8. Behning, A. 1925.
9. Behning, A. 1927.
10. Bigelow, H. B. 1915.
11. Bigelow, H. B. 1926.
12. Bousefield, E. L. 1951.
13. Bovallius, C. 1889.
14. Brusca, G. J. 1967.
15. Cecchini, C. 1929.
16. Chevreux, E. 1900.
17. Chevreux, E. 1935.
18. Chilton, C. 1912.
19. Colosi, G. 1918.
20. Evans, F. 1961.
21. Fage, L. 1960.
22. Furnestin, M.-L. 1960.
23. Grice, G. D. & Hart, A. D. (1962)
24. Holmes, S. J. 1909.

25. Hurley, D. E. 1955.
26. Hurley, D. E. 1956.
27. Hurley, D. E. 1960*a*.
28. Hurley, D. E. 1960*b*.
29. Irie, H. 1959.
30. Mogk, H. 1927.
31. Pillai, N. K. 1957.
32. Pirlot, J.-M. 1929.
33. Pirlot, J.-M. 1930.
34. Pirlot, J.-M. 1938.
35. Pirlot, J.-M. 1939.
36. Reid, D. M. 1955.
37. Ruffo, S. 1939.
38. Sars, G. O. 1891.
39. Senna, A. 1903.
39a. Senna, A. 1908.
40. Sexton, E. W. 1911.
41. Shih, C. T. 1969.
42. Shoemaker, C. R. 1925.
43. Shoemaker, C. R. 1945.
44. Siegfried, W. R. 1963.
45. Spandl, H. 1924.
46. Spandl, H. 1927.
47. Stadel, O. 1958.
48. Stebbing, T. R. R. 1888.
49. Stebbing, T. R. R. 1895.
50. Stebbing, T. R. R. 1904.
51. Stebbing, T. R. R. 1910.
52. Stebbing, T. R. R. 1924.
53. Stephensen, K. 1918.
54. Stephensen, K. 1923.
55. Stephensen, K. 1924.
56. Stephensen, K. 1926.
57. Stephensen, K. 1933.
58. Stewart, D. A. 1913.
59. Tattersall, W. M. 1906.
60. Tattersall, W. M. 1913.
61. Thorsteinson, E. D. 1941.
62. Tsuruta, A. 1963.
63. Vinogradov, M. E. 1956.
64. Vinogradov, M. E. 1966
65. Vosseler, J. 1901.
66. Wagler, E. 1926.
67. Wagler, E. 1927.
68. Walker, A. O. 1904.
69. Walker, A. O. 1909.
70. Woltereck, R. 1903.
71. Woltereck, R. 1905.
72. Woltereck, R. 1927.
73. Yang, W. T. 1960.

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THE MEDIAN EYE OF SOME SOUTH AFRICAN PALINURIDAE (DECAPODA, CRUSTACEA)

By

NELLIE F. PATERSON

Cape Town Kaapstad

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By

Nellie F. Paterson

South African Museum, Cape Town

(With 9 figures)

[*MS received* 3 *March* 1970]

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Introduction

In an earlier communication (Paterson, 1968) mention was made of the presence of a median eye in the puerulus stage of *Jasus lalandii* and of its persistence in the adult.

Many descriptions of the phyllosoma larvae of various species of Palinuridae are available, but reports concerning the occurrence of the median eye are conflicting. So far as is known, there has been no previous indication of its existence in post-larval stages of *J. lalandii*, but Elofsson (1963, 1965, 1966*c*) has demonstrated that it is retained in a wide range of adult malacostracan and non-malacostracan Crustacea. In each article he has also reviewed and evaluated earlier accounts of the organ and has given original and detailed descriptions of its histology in many different species.

It is evident from Elofsson's (1963) exhaustive studies that the median or nauplius eye of adult Natantia is highly organized and that in adult Reptantia it is degenerate. A comparison of the structure of the median eye of the puerulus stage of *J. lalandii* with Elofsson's findings suggests that it resembles that of some adult Natantia, but further information concerning the median eye of other palinurid material is required before this opinion can be substantiated.

Ann. S. Afr. Mus. **57** (4), 1970: 87–102, 9 figs.

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From dissections of the frontal region of the head of a few adult specimens and, more particularly, from sections of some larval and post-larval stages it has been possible to compare the palinurid median eye with the standard type recognized by Elofsson (1963). Some general conclusions have also been drawn as to its organization at different levels of development.

Material and Methods

In seeking the median eye of adult animals, preserved specimens of *Jasus lalandii* (H. Milne Edwards), *Panulirus homarus* (Linnaeus), *Palinurus gilchristi* Stebbing, and *Scyllarides elisabethae* (Ortmann) were used. The frontal exoskeleton, covering the region termed the bec ocellaire by Elofsson (1963, 1965), was carefully removed and the optic nerves were traced to the brain. The area in which the median eye is usually located was thus exposed, and further dissection under a binocular microscope was required to detect the exact position of the organ.

Details of the median eye were studied in sections of the following material:

Jasus lalandii: phyllosoma larvae measuring 20 and 27 mm in total length; puerulus stage measuring 22 mm in total length; two juvenile females with a total cephalothoracic length (T.C.L.) of 40 and 44 mm; and two males (T.C.L. 90, 95 mm).

Panulirus homarus: a male (T.C.L. 45 mm) and a female (T.C.L. 53 mm).

Panulirus ornatus (Fabricius): puerulus stage, 19 mm in total length.

In preparations of the median eye of the adults the brain was exposed and the protocerebrum was excised with the median eye attached. Bouin's aqueous solution or Zenker's fluid were generally used as fixatives and, after dehydration in cellosolve or in increasing strengths of alcohol, the material was cleared in methyl benzoate celloidin. It was then transferred to benzene and embedded either in paraplast or in a mixture of paraffin wax and ceresin.

Some difficulty was experienced in sectioning the median eye of adult specimens because the surrounding connective tissue remained hard and brittle and no thoroughly satisfactory means of overcoming this was found. Several specimens were double embedded in celloidin and paraffin wax, and a few were treated with a 5% solution of Tergitol 7 in pure ethane diol. The latter procedure has been recommended by Anderson (1964) for sectioning locust eggs and, although it did not produce the desired softening of the tissues, the results were probably better than those obtained by ordinary routine methods.

The sections were cut at 5 to 10 μ thick and were stained either in Mallory's triple stain or in Heidenhain's iron haematoxylin or Hansen's alum haematoxylin with eosin as a counterstain.

In describing the dimensions of the median eye, the height, breadth, and length refer respectively to the dorso-ventral, the maximum width, and the antero-posterior measurements.

Location of Median Eye in Adult Animals

The presence of a median eye has already been reported (Paterson, 1968) in the puerulus stage and in the adults of *Jasus lalandii*. Further dissections of the head region of adult specimens of two palinurids, *Panulirus homarus* and *Palinurus gilchristi*, and one scyllarid, *Scyllarides elisabethae*, suggest that the median eye probably persists in post-larval stages of most Scyllaridea.

After tracing the optic nerves to the brain, the minute pigmented median eye of each animal is discernible in the midst of dense connective tissue between the paired apical nerves (fig. 1) which innervate the apical muscles of the head.

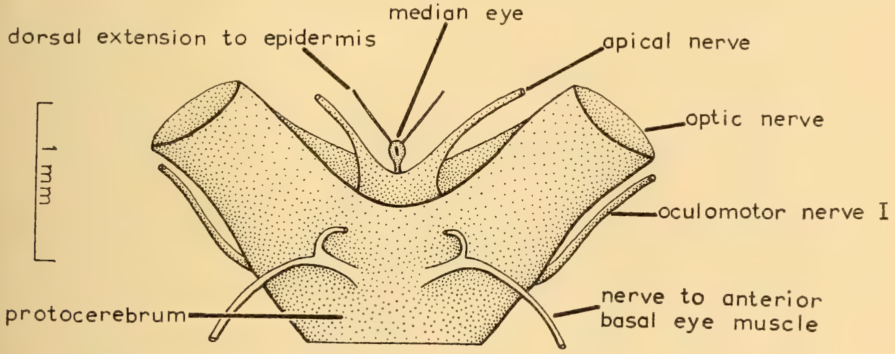

Fig. 1. *Panulirus homarus*. Diagrammatic dorsal view of a dissection of the anterior part of the nervous system of a male (T.C.L. 45 mm), showing the position of the median eye relative to some of the cephalic nerves.

In each species the median eye is situated in the mid-line dorsal to the brain and ventral to the middle cylinder of the compound eyes. Owing to slight differences in the configuration of the cephalic region in the several species, the median eye of *J. lalandii* occurs almost directly below the middle cylinder of the compound eyes. In the other three species it seems to be rather more anterior in position.

The median eye of immature animals and larval stages occupies a similar position, but information concerning its anatomy can only be gained by the examination of serial sections.

Structure of the Median Eye

In a preliminary account of the median eye of the 22 mm puerulus stage of *J. lalandii* (Paterson, 1968) it was concluded that the parts are essentially similar to those of the standard type of median or nauplius eye described by Elofsson (1963) in adult Natantia. It will therefore be convenient to revise the main features of the median eye observed in sections of the puerulus stage of *J. lalandii* before considering its organization in other specimens.

1. *Jasus lalandii*—PUERULUS STAGE

Measuring approximately 90 μ high by 120 μ wide by 130 μ long, the median eye of the puerulus stage lies about 17 μ above the protocerebrum. It is situated beneath the median ophthalmic artery and near the origin of the two optic arteries. It is easily detected by its band of discrete, blackish pigment granules which, in longitudinal sections, are arranged more or less in the shape of an inverted T or Y along the inner borders of two comparatively large lateral cups and a smaller ventral cup (fig. 2*A*, 2*B*). The whole eye is bounded by a delicate, firm membrane which probably originates in the epineurium.

As in species studied by Elofsson (1963), the ventral cup is distinct and contains three everse sensory cells, two of which (fig. 2*A*) are anterior in position to the third.

The lateral cups are not obviously differentiated into regions suggestive of the antero-lateral cups and the paired dorsal frontal organ in Elofsson's accounts of the nauplius eye *sensu lato*. Each cup contains at least 12 everse sensory cells and distinct axons pass outward to form the conspicuous lateral nerve (fig. 2*B*).

The median nerve is short and stout and all its axons appear to leave the eye posteriorly (fig. 2*C*). The axons are doubtless continuous with the three sensory cells of the ventral cup, but some of them may be associated with three paired cells in the posterior portions of the lateral cups.

The cytoplasm of the sensory cells is fairly dense and granular, but tends to be somewhat vacuolated peripherally. The large spherical nuclei have one or more small nucleoli and, distributed between the sensory cells, are small rounded or elongate nuclei which are sometimes arranged in groups of three (fig. 2*A*). They may be comparable to the interspace nuclei which Elofsson (1963, 1966*b*) has associated with the rhabdomes.

The latter seem to be less distinct in the puerulus median eye than in the specimens examined by Elofsson (1963, 1966*b*). Several slight thickenings between adjacent sensory cells and a number of refringent bodies close to the pigment suggest, however, that structures analogous to rhabdomeres and rhabdomes may be faintly delineated in each cup of the puerulus median eye.

A ventral frontal organ has been identified by Elofsson (1963) in a variety of adult decapods. This portion of the complex was not observed with any certainty in the puerulus of *J. lalandii*, but Elofsson (1966*a*) has shown that it may be elusive in the post-larval stages of some species. No ventral connexions with the epidermis are apparent, but extensions from the lateral cups indicate that the latter possess some of the characteristics ascribed by Elofsson to the paired dorsal frontal organ in the nauplius eye of many Decapoda.

2. *Jasus lalandii*—PHYLLOSOMA LARVA

The median eye observed in two phyllosoma larvae of *J. lalandii* broadly resembles that of the 22 mm puerulus stage, but it is slightly smaller. It occurs 12 to 17 μ above the brain and measures about 50 μ high and 62·5 μ wide in

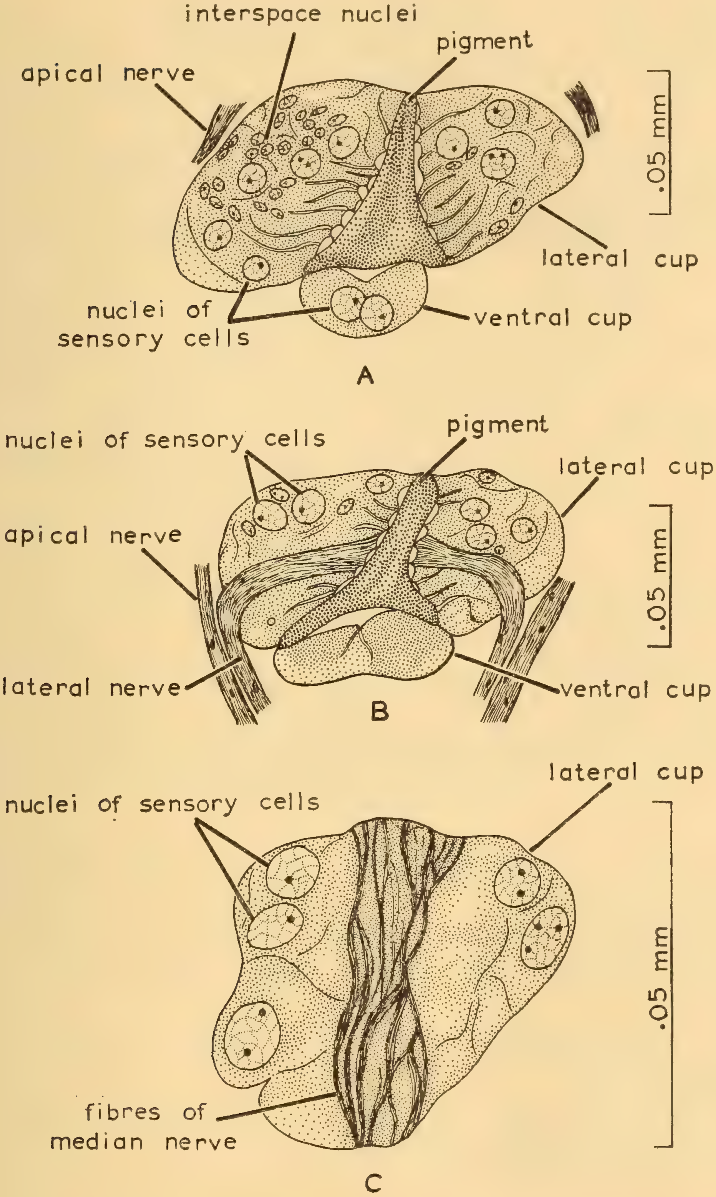

FIG. 2. *Jasus lalandii*. Median eye of the puerulus stage, 22 mm in total length.

A. Frontal section containing nuclei of the sensory cells of the ventral and lateral cups. The clear patches adjacent to the pigment are probably rhabdomes.

B. Section illustrating the medial origin of the axons of the lateral nerves. Parallel to the latter are the apical nerves which innervate the apical muscles of the head.

C. Caudal section at emergence of the median nerve.

the 20 mm larva (fig. 3). The dimensions of the median eye of the 27 mm phyllosoma larva are less certain because the sections are somewhat oblique, but a reconstruction of the eye suggests that it is at least 76 μ high and 84 μ wide.

As in the puerulus stage, the median eye consists of a small vental and two larger lateral cups which are clearly defined and separated by pigment in the 20 mm phyllosoma larva (fig. 3). The pigment seems to be more diffuse and the limits of the cups are less distinct in the median eye of the 27 mm phyllosoma larva.

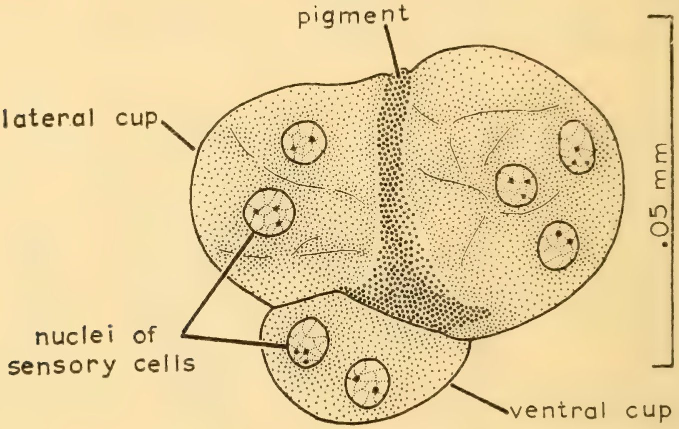

FIG. 3. *Jasus lalandii.* Median eye of 20 mm phyllosoma larva. Characteristically, one ventral and two lateral cups are separated by a band of pigment granules. Each cup contains the conspicuous nuclei of some of the sensory cells.

The cups are filled with a granular cytoplasm in which cell boundaries are difficult to detect. Judging by the conspicuous nuclei, however, there are three sensory cells in the ventral cup and probably at least nine sensory cells in each lateral cup. A number of non-sensory cell nuclei are also evident in the 27 mm phyllosoma larva and possible rhabdomes are faintly indicated near the pigment.

The median and lateral nerves are more obvious in the 27 mm larva than in the present preparations of the 20 mm phyllosoma larva and are traceable to the protocerebrum.

A ventral frontal organ was not observed, but the lateral cups seem to be connected dorsally with the epidermis.

3. *Jasus lalandii* — JUVENILE

The median eye in two juvenile animals (T.C.L. 40, 44 mm) is rather smaller than that of the puerulus stage. It lies about 40 μ above the brain and measures 35 μ high by 77 μ wide. As, however, it extends antero-posteriorly for at least 160 μ, it is more elongate than the median eye of the puerulus stage.

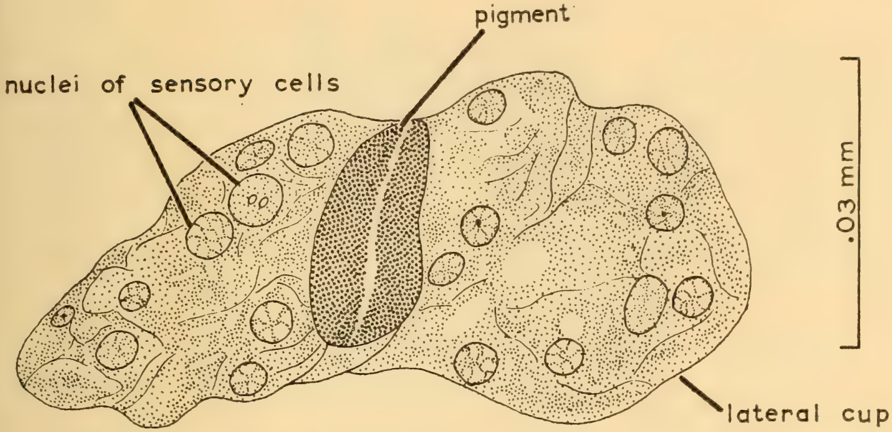

FIG. 4. *Jasus lalandii.* Median eye of juvenile female (T.C.L. 44 mm). The eye is tripartite, but the ventral cup is small and is hardly visible in this section.

The eye is apparently tripartite with conspicuous pigment granules between the large lateral cups (fig. 4), but the ventral cup is small and ill defined. The cytoplasm is compact and cell boundaries are obscure, but 12 to 15 relatively large nuclei are present in each lateral cup.

A median and two lateral nerves are visible and the epineurium is continued upward on each side of the median eye around the apical nerve and the beginnings of a possible ventral frontal organ. The latter is not well differentiated, but it seems to foreshadow a similar organ which is more evident in sections of the median eye of adult specimens.

4. *Jasus lalandii* — ADULT

The structure of the median eye of two mature animals (T.C.L. 90, 95 mm) differs markedly from that of younger stages and its condition may be variable (figs 5, 6). It is embedded in tough connective tissue containing large vacuolated cells and, although its dimensions are difficult to determine, it retains a few of the features of a better-organized median eye.

Its position is revealed by somewhat scattered pigment masses which lie about 350 μ above the protocerebrum and extend antero-posteriorly for 300 μ in the smaller specimen and 150 μ in the larger specimen. There is no clear demarcation of the parts into ventral and lateral cups, but in the median eye of both animals a number of dense nuclei (figs 5, 6) are irregularly arranged near the pigment and vaguely suggest the presence of sensory cells associated with possible lateral cups.

The existence of sensory cells is further implied by the occurrence of a median and two lateral nerves (figs 5, 6, 7) connecting the median structure with the brain. The lateral nerves and, to a lesser extent, the median nerve are enclosed in dorsal upgrowths of the epineurium. Less obvious extensions of the

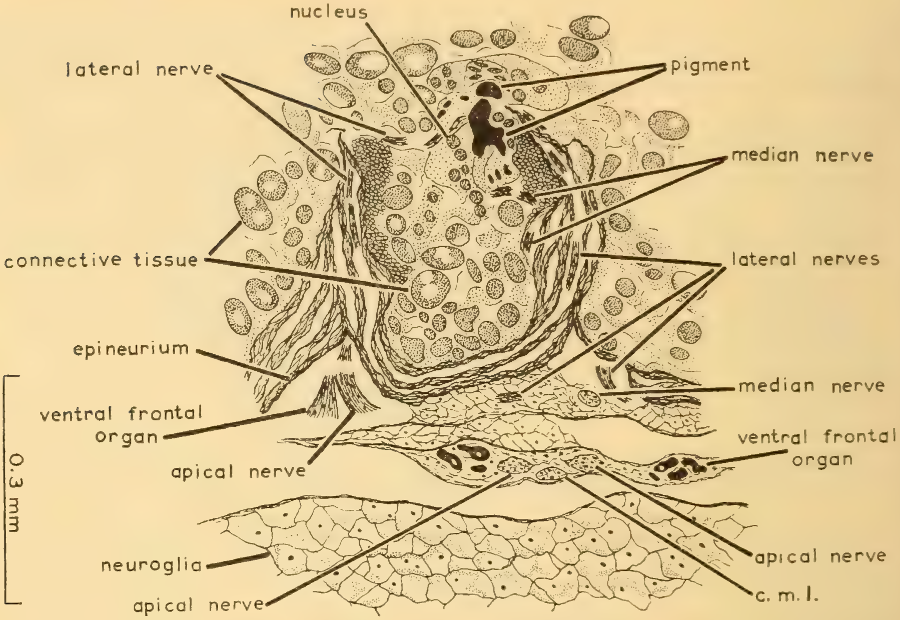

Fig. 5. *Jasus lalandii.* Semi-diagrammatic representation of a section of median eye of adult male (T.C.L. 90 mm), the position of which relative to the whole eye is shown in figure 7. The parts are obscured by connective tissue, but scattered pigment and median and lateral nerves are apparent. Extensions of the epineurium envelop the nerves of the median eye and also the apical nerves and the supposed ventral frontal organ. The section is somewhat tangential and passes through the exits of the right lateral nerve and the left apical nerve and the left ventral frontal organ. Below the epineurium the median and the two lateral nerves are converging and in the lower part of the section their combined fibres (c.m.l.) are located between the right and left apical nerves.

epineurium from the sides of the eye of the larger specimen may be remnants of a dorsal frontal organ.

The lateral and median nerves pass through the epineurium into the neuroglia which surmounts the cellulae superiores anteriores lying between the roots of the optic nerves. The three nerves of the median eye converge and almost lose their identity in the neuroglia but, by plotting their course (fig. 7), it is apparent that they run backward to a common medial centre above the pons cerebri.

On each side of the median eye there are conspicuous strands of epineurium surrounding two fairly wide channels, one of which contains the apical nerve. The cord in the other channel has been tentatively identified as the ventral frontal organ (figs 5, 6, 7), the full extent of which was not determined owing to the fact that the median eye and adjoining tissues were excised for sectioning. There is no doubt, however, that the presumed ventral frontal organ passes forward in front of the median eye parallel to the apical nerve and that it also accompanies the latter posteriorly through the neuroglia.

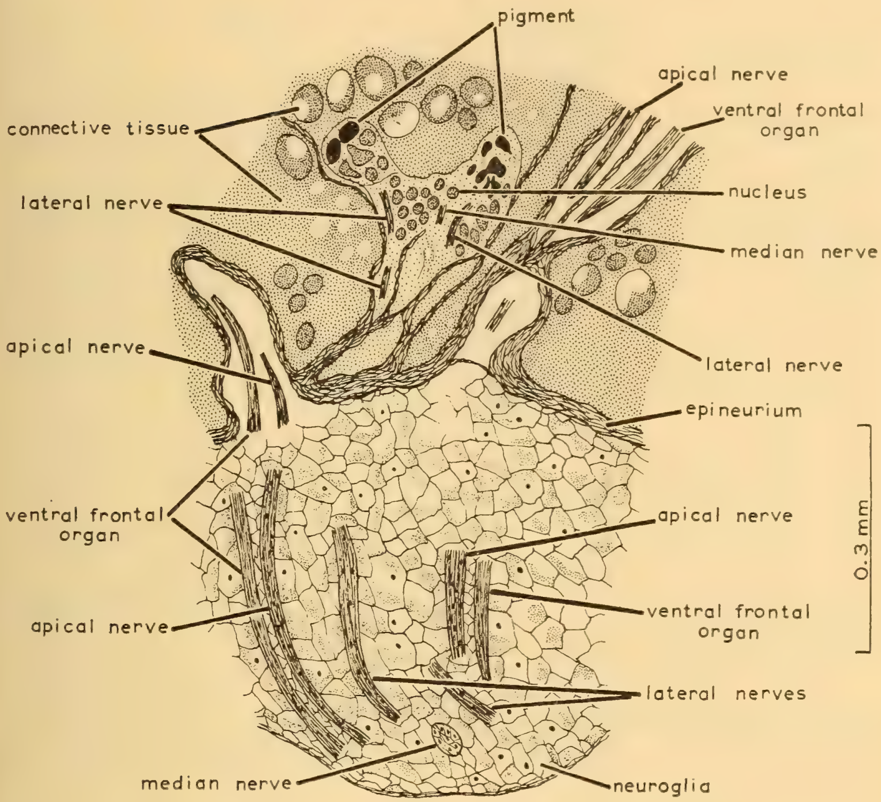

FIG. 6. *Jasus lalandii.* Sketch of median eye of adult male (T.C.L. 95 mm), based on three superimposed sections 20 μ apart. As in the previous figure, the median eye is surrounded by connective tissue and consists essentially of pigment granules and three nerves. The conspicuous apical nerves and the presumed ventral frontal organ are enclosed in channels formed by the epineurium. They also traverse the neuroglia which occurs above the cellulae superiores anteriores of the protocerebrum.

The supposed ventral frontal organ is tubular and consists of a homogeneous substance and a few faint fibrous strands. In transverse sections (fig. 5) it is manifest in several irregularly-shaped bodies, some of which have translucent patches. This slightly wider portion below the epineurium is reminiscent of the ventral frontal organ described by Elofsson (1963) in a number of adult Decapoda, but in the present material it seems to lack definite cells and rhabdomes.

The apical nerve and adjacent ventral frontal organ are more easily traced through the neuroglia than are the nerves of the median eye. They pass backward between the cellulae superiores anteriores, and on each side they combine in a centre dorsal to the pons cerebri (fig. 7) and lateral to the centre of the median eye.

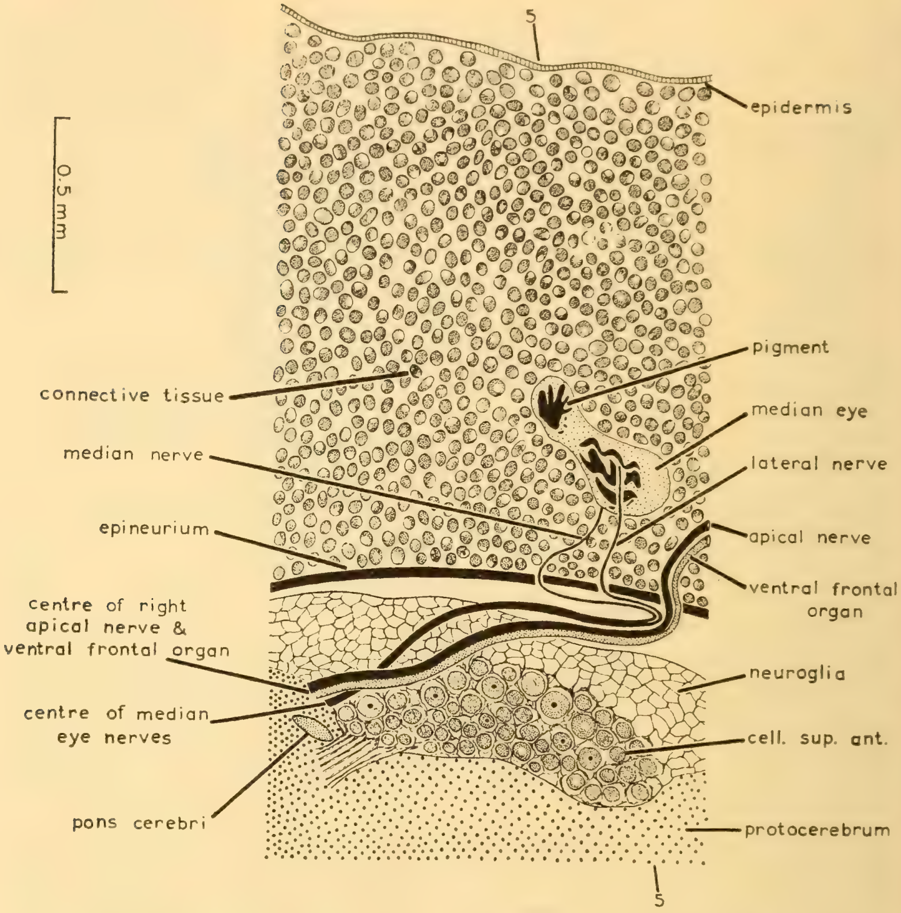

FIG. 7. *Jasus lalandii.* Graphical reconstruction of right lateral view of median eye of adult male (T.C.L. 90 mm). The eye is embedded in dense connective tissue and its shape is conjectural. The median and lateral nerves merge below the epineurium and have a common medial centre above the pons cerebri. On each side of the eye the apical nerve and the presumed ventral frontal organ also combine below the epineurium and pass backward to a centre lateral to that of the median eye. The indistinct dorsal frontal organ has not been indicated. The extensions of the epineurium which surround the nerves and the ventral frontal organ have been omitted. The line 5 —— 5 marks the position of the section in figure 5. *cell. sup. ant.*, cellulae superiores anteriores.

5. *Panulirus ornatus* — PUERULUS STAGE

Sections of the anterior part of the head of two specimens, each 19 mm in total length, reveal that the median eye of this puerulus stage is smaller than that of the puerulus stage of *J. lalandii.* Histological details are also less distinct, but this may be the result of poorer fixation of the material.

The median eye is approximately 40 μ high, 75 μ wide, and 95 to 100 μ long, and is located about 20 to 25 μ dorsal to the protocerebrum. A broad

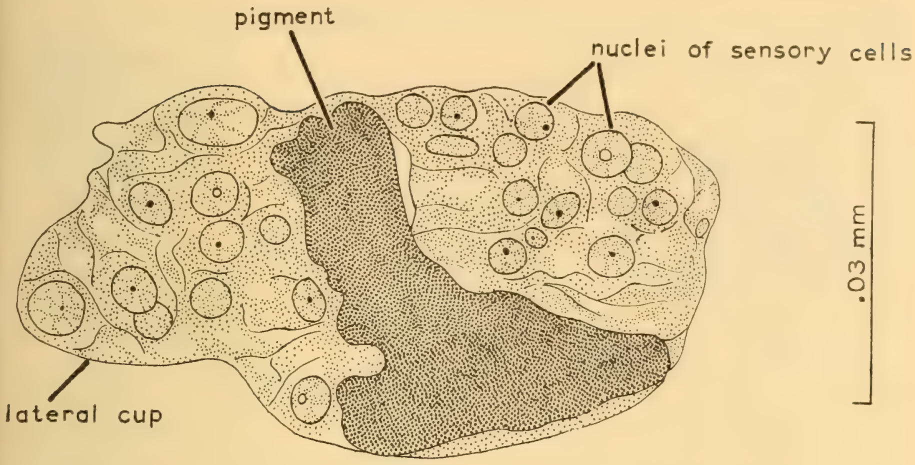

FIG. 8. *Panulirus ornatus*. Section of median eye of a 19 mm puerulus stage. The large lateral cups are separated by a broad band of pigment.

band of pigment (fig. 8) divides the eye into two large lateral cups and a relatively small ventral cup. Up to 15 sensory cell nuclei are apparent in each lateral cup, but cell boundaries are indistinct. Only one large nucleus is evident in the ventral cup, and the presence of rhabdomes is uncertain.

Characteristically, the median and lateral nerves of the eye lie between the pair of apical nerves. Their association with the protocerebrum is obvious, but the passage of the axons through the cups is more obscure than in the median eye of the puerulus stage of *J. lalandii*. The eye is enclosed in a thin wall which is continuous with the epineurium, and the lateral cups are connected with the epidermis by a pair of dorsal tubes. The presence of the latter suggests that the paired dorsal frontal organ is represented in the lateral cups. The ventral frontal organ is imperceptible and is probably lacking.

6. *Panulirus homarus* — IMMATURE

From an examination of sections of the median eye of two animals (T.C.L. 45, 53 mm), it has been concluded that, as in *J. lalandii*, there is a progressive deterioration of the organ in post-larval stages.

The smaller specimen is an immature male in which the median eye (fig. 9) is rather reduced but still has the form of a fairly well-developed organ. It is situated at least 45 μ above the brain and measures about 40 μ high, 110 μ wide, and 120 μ long.

The whole is a compact structure enveloped in a broad band of epineurial fibres and surrounded by connective tissue which is less dense than that observed in the adults of *J. lalandii*. Although most of the pigment is scattered, in places it is massed together and separates two lateral cups (fig. 9). Cell boundaries are indistinguishable, but the presence of a number of dense nuclei suggests

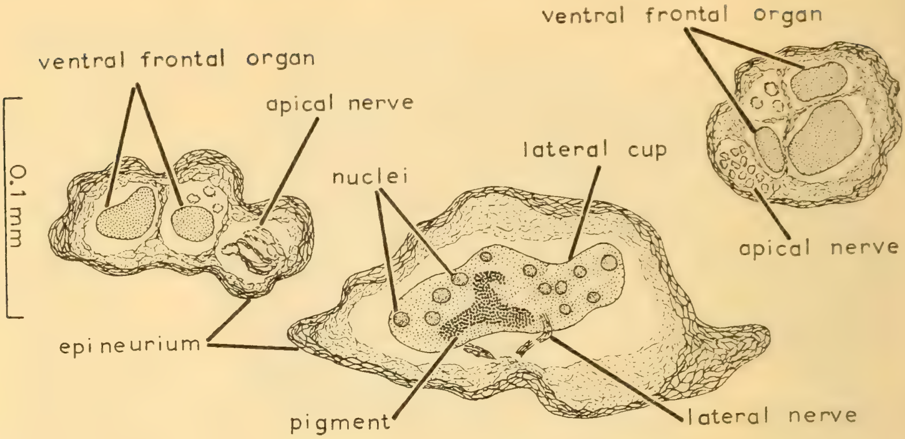

FIG. 9. *Panulirus homarus*. Section showing the small median eye, the apical nerves, and the presumed ventral frontal organ in a male (T.C.L. 45 mm). The median nerve is visible in a section 30 μ behind this one. The surrounding connective tissue has been omitted.

that each lateral cup contains ten or more sensory cells. The ventral cup is unrecognizable, but the fibres of the median nerve are evident in caudal sections of the median eye.

A lateral nerve (fig. 9) is associated with each lateral cup, and some distance from the median eye there are prominent extensions of the epineurium which enclose the apical nerves and a potential ventral frontal organ. The latter seems to be a compound tubule consisting of a homogeneous substance with no obvious cellular structures.

The larger specimen, a female, is probably almost mature and, perhaps owing to inferior fixation, the parts of the median eye are not clearly differentiated. It appears to be amorphous with scattered pigment, but the normal complement of nerves and a possible ventral frontal organ are present.

Some similarity is evident between the median eye in these specimens and that of post-larval stages of *J. lalandii* and, as in the adults of the latter species, the median eye is overshadowed by the development of the ventral frontal organ.

DISCUSSION

Although the median or nauplius eye is characteristic of larval Crustacea, it has seldom been mentioned in accounts of the phyllosoma larvae of species of Palinuridae and Scyllaridae. It has, however, occasionally been depicted in illustrations accompanying descriptions of phyllosoma larvae.

Some investigators have concluded that the median eye is present only in young phyllosoma stages. For instance, W. von Bonde (1930) believed that it was absent in the larger larvae of *Panulirus* and *Scyllarides*, and C. von Bonde

(1936) has stated that it disappears after the 3·8 mm phyllosoma stage in *Jasus lalandii*.

A somewhat similar opinion has been expressed by Lazarus (1967) who inferred that in *J. lalandii* the median eye occurs only in the first five of a series of 13 phyllosoma larval stages. The median eye is nevertheless apparent in the two phyllosoma larvae of *J. lalandii* which are included in the present study and which correspond respectively to Stage X and Stage XII or XIII in the key devised by Lazarus. An examination of material in the South African Museum collection also indicates that even large-sized phyllosoma larvae possess a median eye. It is, however, rather more ventral in position than in younger larvae, and may be difficult to detect in some preserved specimens.

The median eye not only occurs in the phyllosoma larvae of South African Palinuridae, but it is also present in the puerulus stage of *J. lalandii* and *Panulirus ornatus*. These finding are supported by descriptions of the developmental stages of certain other Scyllaridea. Johnson (1956) has shown that a median eye is present in all the phyllosoma stages and in the puerulus of *Panulirus interruptus* (Randall), and Robertson (1968) has mentioned that it is visible in freshly-collected post-larval stages of *Scyllarus americanus* (Smith).

Dissections of *J. lalandii*, *Panulirus homarus*, *Palinurus gilchristi*, and *Scyllarides elisabethae* demonstrate that the median eye persists in the adults of representative South African Scyllaridea. This observation is, however, not without precedence, because Bumpus (1894) briefly reported the presence of a median eye in the adults of a number of Eumalacostraca, including *Palinurus elephas* (*vulgaris*) and *Scyllarus arctus*.

More recently, careful studies by Elofsson (1963, 1965, 1966*c*) have proved that the median eye occurs in the adults of many malacostracan and non-malacostracan species. It is therefore likely that the median eye will be found in most adult Scyllaridea, and statements regarding its absence in the final phyllosoma stages seem to be questionable.

In larval and immature Palinuridae the median eye is fairly well developed and broadly resembles the organ described by Elofsson (1963) in adult Natantia. The present material also suggests that the median eye in adult Palinuridae is almost as reduced as it is in species of Reptantia investigated by Elofsson (1963).

According to Elofsson (1963, 1965, 1966), the median complex may consist of five cups which together constitute the nauplius eye *sensu lato*. Two of the cups are postero-lateral and represent the paired dorsal frontal organ. The other three cups, one ventral and two antero-lateral, are defined by Elofsson as the nauplius eye *sensu stricto*.

The elements of the median eye of larval and immature palinurids are not so sharply differentiated as they are in most of Elofsson's specimens, but the eye is at least tripartite. It is composed of one ventral and two relatively large lateral cups which are separated by conspicuous pigment granules. Each cup contains everse sensory cells, the axons of which give rise to a median and two lateral nerves. Three sensory cells usually occur in the small ventral cup which is thus directly comparable to the ventral cup of the nauplius eye *sensu stricto* described by Elofsson.

The two lateral cups seem to correspond to the paired dorsal frontal organ of the median eye of other Decapoda (Elofsson, 1963). In each cup there are from nine to 15 sensory cells, the number varying in the different stages and species. As in Elofsson's accounts of the dorsal frontal organ, the axons of the sensory cells of the lateral cups in the palinurid median eye form the conspicuous lateral nerves.

The median nerve has been shown by Elofsson (1963, 1965) to be composed of the axons of the sensory cells of the nauplius eye *sensu stricto*. Judging by sections of the median eye of the puerulus stage of *J. lalandii*, the fibres of the median nerve in Palinuridae leave the eye posteriorly behind the pigment lamellae. They are associated with the three sensory cells of the ventral cup and possibly with three pairs of postero-lateral sensory cells. Although the latter are not clearly differentiated from other lateral sensory cells, they may be analogous to the cells of the antero-lateral cups of the nauplius eye *sensu stricto* as defined by Elofsson.

The presence of large lateral cups (dorsal frontal organ) and discrete median and lateral nerves suggest that the median eye of larval Palinuridae represents a variation of the nauplius eye *sensu lato* of the Natantia examined by Elofsson (1963). To some extent, it also resembles the median eye of Stomatopoda (Elofsson, 1965) in which the main components are a ventral cup and a paired dorsal frontal organ. In the Stomatopoda, however, the median and lateral nerves are fused, whereas in larval and immature Palinuridae the three nerves are clearly separated as they leave the eye and proceed to the protocerebrum.

Compared with the larval median eye, the organ in adult Palinuridae is rather degenerate and is recognizable mainly by a few scattered aggregations of pigment granules and several dense nuclei. Its shape is indeterminate, but the presence of a median and a pair of lateral nerves suggests the retention of some of the features of the more highly organized median eye of immature stages. On the whole, the median eye of adult palinurids seems to be rather better developed than that observed by Elofsson (1963) in other adult Reptantia in which the median eye is reduced to a small mass of pigment lying on or below the epineurium. In all stages of Palinuridae the median eye is located some distance above the protocerebrum and is generally embedded in connective tissue.

Most of the Malacostraca studied by Elofsson (1963, 1965) possess a paired tubular ventral frontal organ which is distinct from the median complex. This organ was not identified in the present material of phyllosoma and puerulus stages, but a structure, thought to be comparable to a ventral frontal organ, is present in immature and adult specimens. It is enveloped by extensions of the epineurium and is relatively long and tubular, but it contains no obvious cells or rhabdomes. On each side of the median eye, it runs parallel and adjacent to the apical nerve and the two are easily traced backward to a paired centre in the protocerebrum above the pons cerebri. In the Palinuridae the development of a paired ventral frontal organ in the adult seems to accompany the reduction of the median eye. If, as Elofsson (1963) has suggested, the ventral frontal organ is a photoreceptor, its presence in adult Reptantia may compensate for the degeneration of the median eye.

The general impression gained from Elofsson's comprehensive studies (1963, 1965, 1966) is that the most perfect median eye occurs in natant adults and in free-swimming larval and post-larval stages. Too few specimens of Palinuridae have been investigated to ascertain if there is any direct correlation between the habits of the animals and the condition of their median eye. Nevertheless, it is evident that the median eye of the phyllosoma larva and the puerulus stage is better developed than that of juvenile and mature animals. It may also be significant that the organization of the median eye of the pelagic stages of Palinuridae resembles that of natant adult Reptantia.

During the past 20 years, a number of investigators have demonstrated that the median eye of *Limulus* and the ocelli of various insects are sensitive to light. It is only recently, however, that electrophysiological experiments performed by Eaton & Boyd (1970) have proved that photic responses occur in the nauplius eye of *Pandalus borealis*. This significant discovery suggests that the median eye of most marine Decapoda may function as a small photoreceptor. The photic activity of the organ seems to be acceptable for surface dwellers in which the integument is often transparent, but the purpose of the reduced median eye in benthic adults with opaque exoskeletons is more problematic. The persistence of small quantities of pigment and the normal complement of nerves seem to denote that the median eye of adult Palinuridae may still be associated with light perception and that it represents rather more than the vestige of an organ developed earlier in response to the special needs of larval life.

Summary

Attention is focused on the fact that a median eye is present in larval and post-larval stages of representative species of South African Palinuridae.

Dissections of adult specimens of *Jasus lalandii* (H. Milne Edwards), *Panulirus homarus* (Linnaeus), *Palinurus gilchristi* Stebbing, and *Scyllarides elisabethae* (Ortmann) demonstrate that the median eye persists in mature Scyllaridea.

Microscopic details were studied in serial sections of the median eye of the phyllosoma larvae, the puerulus stage, the juveniles, and the adults of *J. lalandii*, and also in the puerulus stage of *Panulirus ornatus* (Fabricius) and in young specimens of *Panulirus homarus*.

In larval and immature Palinuridae the median eye is more highly organized than that of the adult. It consists of a small ventral and two large lateral cups separated by pigment. Each cup contains everse sensory cells, the axons of which form a median and two lateral nerves. The lateral cups are comparable with the paired dorsal frontal organ described by Elofsson (1963) in the nauplius eye of adult Decapoda.

The median eye of adult Palinuridae is greatly reduced, but some aggregations of pigment granules and three conspicuous nerves are discernible.

A tubular structure, which has tentatively been identified as a paired ventral frontal organ, is foreshadowed in juvenile animals and is better differentiated in adult specimens.

With reference to Elofsson's (1963) observations on the nauplius eye of adult Decapoda, it has been concluded that the median eye of the phyllosoma and puerulus stages of Palinuridae is comparable with that of adult Natantia. It is also considered that the median eye of adult palinurids is less degenerate than that of other Reptantia so far investigated.

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By

BRIAN KENSLEY

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A SMALL COLLECTION OF DECAPOD CRUSTACEA FROM MOÇAMBIQUE

By

Brian Kensley
South African Museum, Cape Town

(With 14 figures)

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Introduction

During July 1968 a team of biologists from the University of Cape Town, led by Professor J. H. Day, visited Inhambane, on the coast of Moçambique. The purpose of the visit was to do a second survey of the Morrumbene estuary, as part of the series of estuarine surveys carried out around southern Africa. At the same time, an opportunity was taken of collecting plant and animal specimens at Jangamo (24.06S., 35.21E.), 32 km south of Inhambane. The collecting was done along the shore and nearby reef, supplemented by diving. The decapod crustacean material was submitted to the South African Museum for identification. A list of the species, together with the catalogue numbers of the Zoology Department, University of Cape Town, is given. In many cases, duplicate material has been kept in the collection of the South African Museum, where the type material is housed.

Species List

Species	*Male*	*Female*	*Juv.*	*Cat. No.*
BRACHYURA				
Family **Majidae**				
Dehaanius quadridentatus (Krauss)	2	2	—	14T
Dehaanius scutellatus (Mcleay)	1	2 ovig	—	14S
Hyastenus spinosus H. Milne Edwards	4	6 + 1 ovig	—	14U
Menaethiops delagoae Barnard	2	2	—	15V
Menaethiops fascicularis (Krauss)	4	1	—	15U
Menaethiops natalensis Barnard	—	1 + 1 ovig	—	14W
Menaethius monocerus (Latreille)	—	1 ovig	—	14Y
Schizophrys aspera (H. Milne Edwards) ..	1	—	—	14X

Ann. S. Afr. Mus. **57** (5), 1970: 103–122, 14 figs.

Species	*Male*	*Female*	*Juv.*	*Cat. No.*
Family **Hymenosomatidae**				
Elamena mathei (Desmarest)	3	3 + 3 ovig	—	15B
Family **Portunidae**				
Charybdis annulata (Fabricius)	2	—	—	14B
Charybdis orientalis Dana	1	—	—	14D
Thalamita admete (Herbst)	1	1	—	14F
Thalamita sp.	—	1 + 1 ovig	—	14G
Thalamita woodmasoni Alcock	—	1	—	14H
Family **Grapsidae**				
Grapsus tourmanoiri Crosnier	5	1	—	14J
Pachygrapsus minutus (A. Milne Edwards)	2	2 + 2 ovig	—	16C
Percnon planissimum (Herbst)	5	4 ovig	—	14A
Planes cyaneus Dana	—	—	1	16F
Varuna litterata (Fabricius)	1	—	—	16D
Family **Ocypodidae**				
Ocypode ceratophthalmus (Pallas)	1	2	—	14X
Family **Xanthidae**				
Actaea parvula (Krauss)	1	1	—	15G
Actaea polyacantha (Heller)	—	1	—	15S
Actaea rueppellii (Krauss)	—	1 ovig	—	15J
Atergatopsis signata (Adams & White)	1	—	—	15C
Carpilodes cinctimanus (White)	—	1	—	15D
Carpilodes monticulosus A. Milne Edwards	1	—	—	15R
Chlorodiella laevissima (Dana)	2	1	—	15T
Chlorodopsis areolata (H. Milne Edwards)	2	2 + 2 ovig	—	15K
Lybia plumosa Barnard	3	3	—	15M
Lybia tessellata (Latreille)	—	1 ovig	—	16B
Macromedaeus quinquedentatus (Krauss)	—	1	—	15W
Pilumnus longicornis Hilgendorf	—	1 ovig	—	15H 15P
Trapezia cymodoce (Herbst)	5	2 ovig	—	15A
Trapezia guttata Rüppell	1	3	—	16E
Zosimus aeneus (Linnaeus)	1	—	—	15N
Zozymodes cavipes (Dana)	1	—	—	15L
Zozymodes xanthoides (Krauss)	1	3	—	15F
Family **Dromiidae**				
Cryptodromia bullifera Alcock	1	—	—	14Q
Cryptodromia canaliculata Stimpson	6	2 ovig	—	14P
Petalomera laevis n. sp.	1	2 ovig	—	S.A.M.A. 12824–5 14N
Family **Calappidae**				
Matuta banksi Leach	2	—	—	14E
Family **Leucosiidae**				
Philyra scabriuscula (Fabricius)	1	—	—	16A
ANOMURA				
Family **Hippidae**				
Emerita austroafricana Schmitt	1	1 ovig	—	14L
Hippa adactyla Fabricius	2	—	—	14M
Family **Paguridae**				
Calcinus gaimardii (H. Milne Edwards)	2	4	—	13T
Calcinus laevimanus (Randall)	1	—	—	13V
Clibanarius virescens (Krauss)	5	—	3	13U
Family **Porcellanidae**				
Pachycheles natalensis (Krauss)	6	3 ovig	—	13N
	5	1 + 3 ovig	1	13R

Species	*Male*	*Female*	*Juv.*	*Cat. No.*
Petrolisthes alobatus Laurie	1	1 ovig	—	13J
Petrolisthes coccineus (Owen)	1	—	—	13K
Petrolisthes lamarckii (Leach)	2	3 + 1 ovig	2	13L
Petrolisthes militaris (Heller)	2	2 + 1 ovig	—	14Z
Petrolisthes virgatus Barnard	—	1 ovig	—	13M
Porcellana dehaanii Krauss	10	2 ovig	26	13P
PALINURA				
Family **Palinuridae**				
Panulirus penicillatus (Olivier)	1	—	—	15B
NATANTIA				
Family **Palaemonidae**				
Palaemon (Palaemon) pacificus Stimpson	1	—	1	13G
Family **Hippolytidae**				
Alope orientalis (De Man)	6	2 + 7 ovig	5	13D
Hippolysmata kukenthali (De Man)	1	1	—	13E
Hippolyte ventricosa H. Milne Edwards	—	1 ovig	—	13Y
Saron marmoratus (Olivier)	3	—	—	13S
Thor amboinensis (De Man)	1	—	—	13F
Family **Alpheidae**				
Alpheus lottini Guérin	1	2 ovig	—	13A
Alpheus luciae Barnard	1	1 ovig	—	13C
Alpheus paragracilis Coutière	—	1 ovig	—	13H
Athanas minikoensis Coutière	1	—	—	13Z

SYSTEMATIC DISCUSSION

BRACHYURA

Family **Grapsidae**

Pachygrapsus minutus A. Milne Edwards

Figs 1a–d

Pachygrapsus minutus A. Milne Edwards, Tesch, 1918: 77. Gordon, 1934: 7. Sakai, 1939: 656; 1965: 194. Crosnier, 1965: 26.

Description: Carapace wider than long, lateral margins strongly convergent posteriorly, no spine behind outer orbital tooth. Carapace dorsally striate throughout, striae continuous across carapace, not setose. Chelae smooth, carpus with strong spine on inner margin, merus with inner margin bearing three flattened spines. Pereiopods with scattered stiff hairs, meri with two spines on postero-distal edge. Last pair of pereiopods with additional pair of short blunt spines on posterior margin, at about proximal third of merus. Pleopod one of male with numerous setae, concealing curved terminal apically rounded lobe.

Previous records: Most of the Indo-Pacific region.

Material:

	Carapace length	*Carapace breadth*
Male	5·4 mm	7·7 mm
Male	4·9 mm	6·6 mm
Male	4·3 mm	6·0 mm
Female	4·8 mm	6·1 mm
Ovigerous female	5·5 mm	8·0 mm

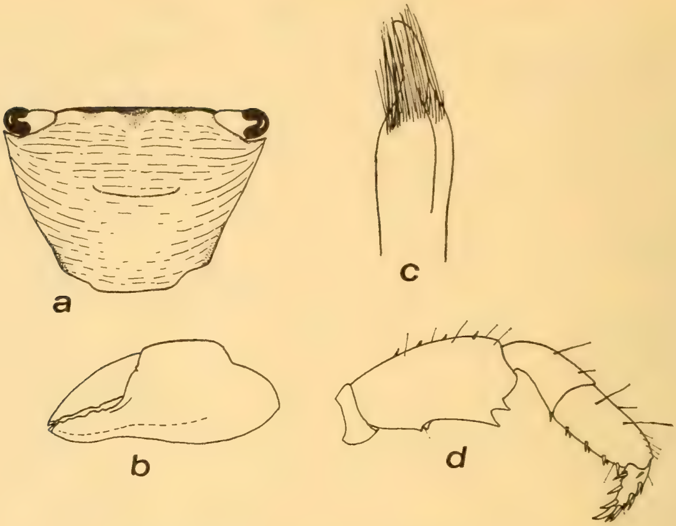

Fig. 1. *Pachygrapsus minutus* A. Milne Edwards

a. Carapace in dorsal view; *b*. External view of left chela; *c*. Apex of pleopod one, male; *d*. Fifth pereiopod.

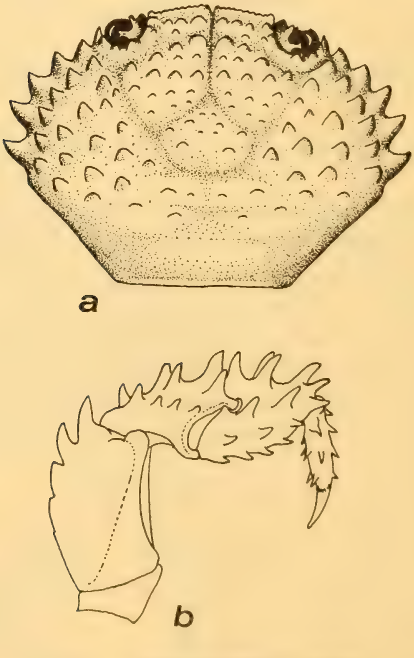

Fig. 2. *Actaea polyacantha* (Heller)

a. Carapace in dorsal view; *b*. Fourth pereiopod.

Remarks: Although this species has been widely recorded from the Indo-Pacific region, including the East African coast, it has hitherto not been taken so far south.

Family **XANTHIDAE**

Actaea polyacantha (Heller)

Figs 2a–b

Actaea polyacantha (Heller), Rathbun, 1911: 222. Odhner, 1925: 57. Sakai, 1939: 486; 1965: 146.

Description: Carapace broader than long, areoles other than 2M and 3M not well defined, covered with flattened tubercles, those of antero-lateral regions being better defined than posterior ones. Antero-lateral margin with six conical tubercles (including external orbital angle). Supra-orbital margin and eyestalks also bearing tubercles. Chela with conical pointed tubercles on palm, upper margin of hand, and base of movable finger. Carpus armed with numerous tubercles. Finger-tips slightly spooned. Walking legs armed with strong conical acute tubercles, those of upper margins being strongest.

Previous records: Indo-Pacific region from Japan to Zanzibar.

Material: One male, carapace length 5·9 mm, carapace breadth 8·1 mm.

Chlorodiella laevissima (Dana)

Figs 3a–d

Chlorodiella laevissima (Dana), Sakai, 1939: 508; 1965: 151. Forest & Guinot, 1961: 95.

Description: Carapace wider than long, smooth, regions not demarked. Antero-lateral border with four teeth, inner two being short and blunt, outer two spinose. Chela stout, smooth, fingers darkened, tips spooned. Walking legs with dactyls equal in length to propodus, apex sharply downcurved, bearing four or five strong spines. Dorsal surface of carpi and meri spinose. Pleopod one of male slightly curved, apex bearing several backwardly directed stout setae, and short spines.

Previous records: Japan, Tahiti, Gilbert and Marianne Islands, Queensland, Ceylon, Andamans, Mauritius.

Material:

	Carapace length	*Carapace breadth*
Male	3·5 mm	5·0 mm (chelae missing)
Male	3·5 mm	5·2 mm (left chela missing)
Female	4·7 mm	7·6 mm (chelae missing)

Family **Dromiidae**

Cryptodromia bullifera Alcock

Figs 4a–c

Cryptodromia bullifera Alcock, 1899: 143; 1901: 51. Borradaile, 1903*a*: 577. Ihle, 1913: 40. Sakai, 1936: 23.

Description: Carapace and appendages covered with pile of short hairs. Frontal region of three acute teeth, lateral teeth slightly divergent, and at

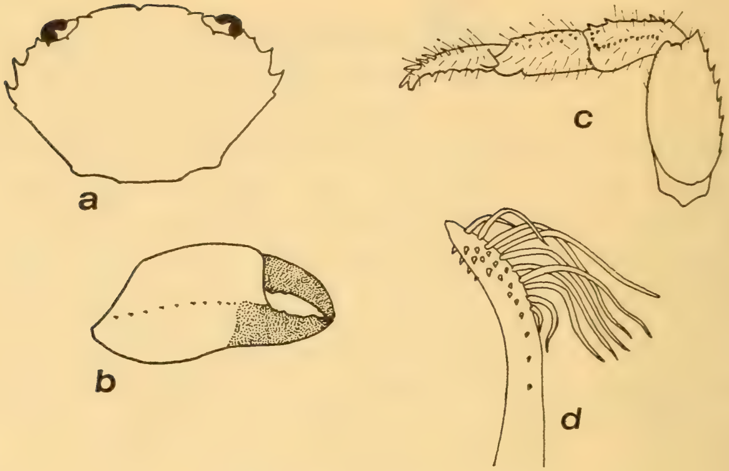

FIG. 3. *Chlorodiella laevissima* (Dana)

a. Carapace in dorsal view; *b.* Right chela; *c.* Fourth pereiopod; *d.* Apex of pleopod one, male.

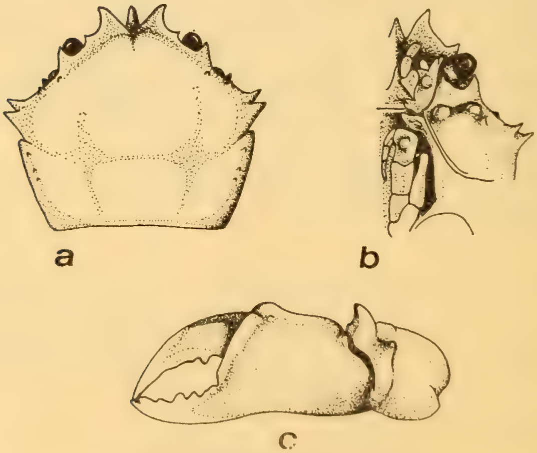

FIG. 4. *Cryptodromia bullifera* Alcock

a. Carapace in dorsal view, setae omitted; *b.* Anterior region in ventral view; *c.* Left chela.

higher level than median tooth. Small acute supra-orbital spine, extra-orbital tooth acute. Lateral margin bearing three teeth, anterior two being prominent, acute. Two tiny tubercles between extra-orbital tooth and first lateral tooth, slightly dorsal to antero-lateral margin. Three tiny tubercles in line dorsal and parallel to postero-lateral margin. Acute sub-orbital and hepatic spine present. Rounded pearl-like knob below sub-orbital spine, dorsal to hepatic spine, on merus of maxilliped three, and on second antennal peduncle segment. Chelae equal, lacking epipods, wide gap between fingers, six or seven teeth on cutting edges. Upper distal portion of hand nodose. Carpus with two prominent tubercles on outer distal margin. Fifth pereiopods longer than fourth.

Previous records: Maldive and Laccadive Islands, Andamans, Ceylon.

Material:

	Carapace length	*Carapace breadth*	*Chela length*
Male	7·4 mm	8·9 mm	5·2 mm

Remarks: Except for the presence of the tiny dorsal tubercles on the carapace, the specimen agrees exactly with Alcock's description of the species. This is the southernmost record of this typically Indian Ocean species.

Cryptodromia canaliculata Stimpson

Figs 5a–c

Cryptodromia canaliculata Stimpson, Alcock, 1899: 142; 1901: 50. Ihle, 1913: 41. Sakai, 1936: 24.
Cryptodromia hirsuta Borradaile, 1903*a*: 577.
Dromia (*Cryptodromia*) *pentagonalis* Hilgendorf, 1878: 814.
Dromia (*Cryptodromia*) *tomentosa* Heller, Hilgendorf, 1878: 813.

Description: Carapace smooth, wider than long, covered with short tomentum of plumose hairs, regions moderately well indicated. Gastric region evenly convex. Front tridentate, median tooth longer and sharper than, and set at lower level to lateral teeth. Small supra-orbital spine and triangular post-orbital tooth separated by wide gap from large antero-lateral tooth. Posterior to latter, two smaller spines, anterior one blunter than posterior one. One large blunt subhepatic spine, one smaller supra-sutural blunt spine, broad infra-orbital lobe. Chelae lacking epipods, completely covered by short hairs, except for distal portion of fingers. Fixed finger with about eight or nine sharp teeth on cutting edge. Dactyl similarly armed. Hand nodulose at base of dactyl. External surface of carpus strongly nodulose. Merus triangular in cross-section. Distal ends of propodi and carpi of walking legs and proximal ends of dactyls nodulose. Latter with strong curved claw, and five smaller spines proximally. Fifth pereiopod longer than fourth.

Previous records: Japan, India, Maldive and Laccadive Islands, Mauritius, Red Sea, Ibo (Moçambique).

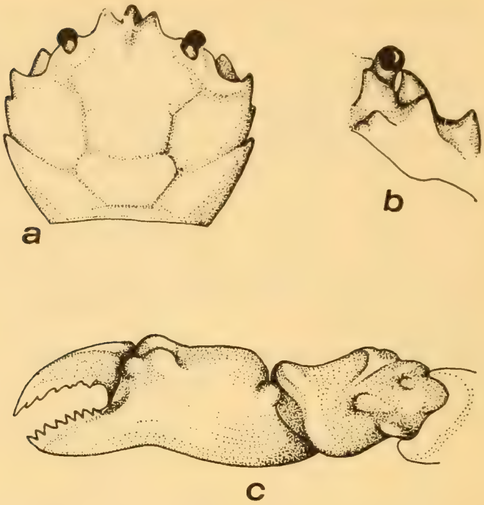

FIG. 5. *Cryptodromia canaliculata* Stimpson

a. Carapace in dorsal view, setae omitted; *b*. Anterior region in ventral view; *c*. Left chela.

Material:

	Carapace length	*Carapace breadth*	*Chela length*
Male	10·5 mm	12·0 mm	8·0 mm
Male	10·0 mm	11·3 mm	6·5 mm
Male	9·0 mm	9·9 mm	—
Male	8·3 mm	10·0 mm	—
Male	8·0 mm	9·0 mm	5·1 mm
Male	7·4 mm	8·1 mm	4·0 mm
Ovigerous female	9·8 mm	10·9 mm	5·2 mm
Ovigerous female	8·9 mm	9·2 mm	5·0 mm

Remarks: Barnard (1950: 328) suggests that *Cryptodromia oktahedros* Stebbing might be synonymous with *C. tomentosa* Heller and *C. hirsuta* Borradaile. The latter two species, however, are synonymous with *C. canaliculata* Stimpson, which more closely resembles *C. pentagonalis*. In fact, if as Ihle (1913) states, *C. canaliculata* is fairly variable, then judging from Hilgendorf's figures (1878, Tafel II, figs 1–4) there is no difference between this species and *C. pentagonalis*.

Genus PETALOMERA

Borradaile, 1903*b*: 300. Ihle, 1913: 48. Rathbun, 1923: 153. Sakai, 1936: 28; 1965: 9. Barnard, 1950: 312.

Petalomera laevis n. sp.

Figs 6a–h

Description: Carapace smooth, with scattering of very fine hairs, regions not defined. Front with acute but not very strong or prominent rostral point. Flanking lobes low, rounded. Eyes just visible dorsally, supra-orbital ridge very slightly emarginate. Antero-lateral margins hardly interrupted by five small blunt bumps, most posterior of which the largest. Posterior margin straight.

Chelipeds equal, bearing epipods, except for fingers almost covered with very short pile of fine hairs. Tip of dactyl ending in tooth, fitting between two terminal teeth of fixed finger (this character more noticeable in male). Cutting edges with about seven rounded teeth. Inner dorsal surface of palm bearing six small granules. Carpus with three rounded nodules, inner surface flattened, defined by dorsal ridge. Merus with inner surface broad, flattened, defined dorsally by a sharp ridge, triangular in cross-section, ventral edge bearing a row of about eight tiny granules.

Dactyl of second pereiopod with two small spines behind the terminal claw, rounded node at articulation with propodus. Latter with two dorso-distal nodes. Inner surface of carpus flattened, dorsally defined by ridge, two rounded nodes in region of articulation with propodus. Merus with flattened inner surface, triangular in cross-section, dorsal ridge sharp. Third pereiopod similar to second. Fourth pereiopod shorter than fifth. Sternal grooves of female ending on small knob near base of second pereiopods. Terminal abdominal segment of male rounded.

Material:	*Carapace length*	*Carapace breadth*	*Chela length*
Holotype, ovigerous female (S.A.M.A12824)	14·2 mm	16·5 mm	8·0 mm
Paratype, ovigerous female (14N)	11·8 mm	13·0 mm	6·3 mm
Paratype, male (S.A.M.A12825)	13·0 mm	14·6 mm	8·3 mm

Remarks: Borradaile (1903: 300) defined the genus *Petalomera* as 'Dromiidae with an epipodite on the cheliped, the walking legs bearing sharp ridges, the carapace varying in the relation of its length to its breadth, but usually broader than long, the regions clearly or indistinctly marked, the efferent branchial channels well made, the sternal grooves of the female ending apart behind the cheliped segment, the fifth leg shorter than the third and without a thorn on the outer side of its last joint'. *Petalomera laevis* differs from none of the above criteria.

The most striking character of this species is the smooth finely pubescent carapace, with its barely noticeable lateral knobs. This immediately separates it from *P. wilsoni* the only other species of this genus known from this region. *P. wilsoni* characteristically has a dense almost shaggy pubescence, which 'accentuates instead of obliterating the underlying regions' (Barnard, 1950: 313). A smooth carapace is characteristic of several species of *Petalomera*, viz. *fukuii*,

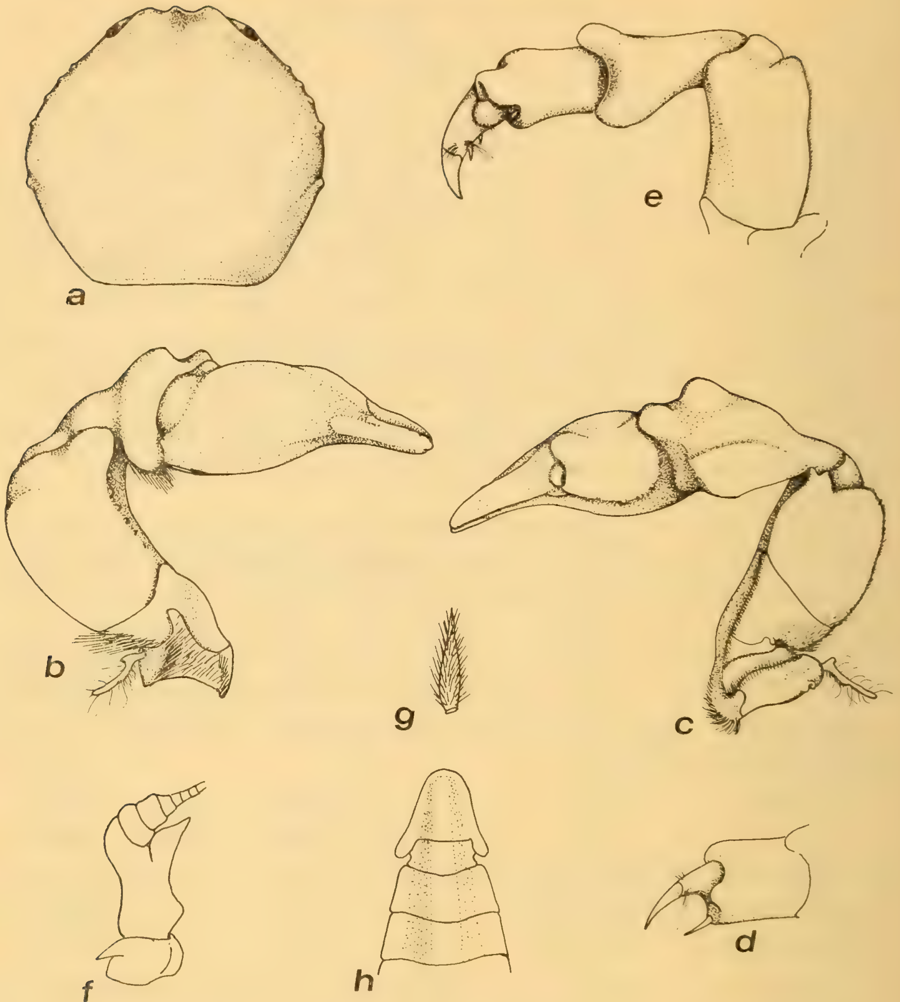

FIG. 6. *Petalomera laevis* n. sp.

a. Carapace in dorsal view; *b.* Right chela in ventral view; *c.* Right chela in dorsal view; *d.* Dactyl and propodus of fourth pereiopod; *e.* Second pereiopod; *f.* Left antenna; *g.* Carapace seta enlarged; *h.* Abdomen of male.

atypica, *pulchra*, *lateralis*, *lamellata* and *depressa*. The present species differs from *P. fukuii* Sakai and *P. depressa* (Baker) in having the pereiopods less granular; from *P. lateralis* (Gray), *P. lamellata* (Ortmann) and *P. atypica* Sakai, which have well-developed antero-lateral carapace spines; from *P. pulchra* Miers which has the carapace regions well defined. There is a superficial resemblance between this species and *Cryptodromia monodous* Stebbing, but differences in the frontal region, the chelae, and the carapace soon separate them.

ANOMURA

Family **Porcellanidae**

Petrolisthes alobatus Laurie

Figs 7a–c

Petrolisthes alobatus Laurie, 1925: 144. Haig, 1965: 46.

Description: Carapace longer than wide, with numerous transverse rugae. Cervical groove broad. Gastric region convex, bearing pair of transverse ridges anteriorly. Supra-orbital margin deeply excavate. Supra-orbital lobe without spine. No post-orbital spine but well-developed lobe. Strong epibranchial spine present, branchial region with a blunt raised tubercle in anterior part. Posterior margin with slight raised rim, medially concave. Maxilliped three with ischium very broad, rugose, merus with expanded rugose lobe on inner margin; dactyl, propodus, carpus with very elongate branched setae. Anterior margin of carpus of pereiopod one finely denticulate, almost smooth. Posterior margin irregular due to rugae. Ventral surface of hand with keel formed by rugae, upper edge of dactyl similar. No gap between fingers. Dactyls of pereiopods two to five with small spine proximal to the subterminal one. Propodi cylindrical, smooth, bearing strong articulated spine at postero-distal angle. Carpus and merus fairly rugose.

Previous records: Cargados Carajos.

Material:

	Carapace length	*Carapace breadth*
Male	10·0 mm	8·4 mm
Ovigerous female ..	12·4 mm	11·0 mm

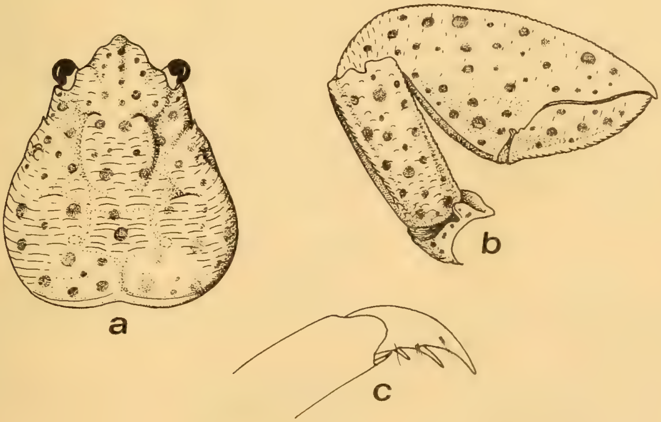

FIG. 7. *Petrolisthes alobatus* Laurie
a. Carapace in dorsal view; *b.* Left cheliped; *c.* Dactyl of second pereiopod.

Remarks: The specimens were taken from the actinopharynx of a large sea anemone, found in about 0·9 m of water. Commensalism with sea anemones has not previously been reported for *P. alobatus*, but is known for *P. maculatus* (= *P. ohshimai*) which has been found in a species of *Stoichactis* (Haig, 1965; Macnae, 1968).

Petrolisthes coccineus (Owen)

Figs 8a–f

Petrolisthes coccineus (Owen), Laurie, 1925: 143. Miyake, 1943: 54. Haig, 1965: 46.
Petrolisthes barbatus Heller, De Man, 1893: 296.

Description: Carapace only slightly wider than long, covered with transverse rugae, especially in anterior region. Rugae bearing short fringe of setae. Rostral margin finely denticulate. Strong supra-orbital spine present. Carapace margin between outer orbital angle and strong epibranchial spine also finely denticulate. Abdomen with bands of short stiff setae and scattered longer stiff setae. Entire cheliped surface rugose. Merus with toothed lobe at antero-distal angle, two strong spines on dorsal surface of distal margin. Carpus with anterior margin bearing four broad rugose spines. Distal margin of each spine bearing numerous plumed setae, posterior margin rugose, bearing three spines distally. Postero-distal angle lobe bispinose. Outer margin of hand denticulate, proximally some of denticles stronger than others. Entire under surface of cheliped rugose; upper surface bearing short setae. Pereiopods two to four with meri bearing about nine strong spines and dense fringe of plumose setae on anterior margin. Dorsal surface of meri bearing setose rugae. Postero-distal angle with two spines. Carpi with spine on antero-distal lobe, numerous scattered stiff setae, rows of plumose setae. Propodus cylindrical, with long scattered setae, ventral surface of distal portion with three or four strong spines, posterior surface with single spine at about midpoint. Dactyl with three spines on inner margin. Antenna with basal peduncular segment bearing denticulate lobe; second segment with several denticles on anterior margin. Basal antennular segment with four spines on anterior margin. Merus of maxilliped three with triangular lobe on inner margin bearing spine at the apex. Much colour lost in preservative, but anteriorly, some brilliant crimson remains.

Previous records: Seychelles, Flores Sea, Nicobar Islands.

Material:

	Carapace length	*Carapace breadth*
Male	17·2 mm	18·0 mm

Left cheliped missing, right cheliped—dactyl 12·0 mm, propodus 29·9 mm, carpus 15·6 mm.

Remarks: This specimen agrees exactly with Laurie's specimen from the Seychelles. De Man's description of *P. barbatus* mentions eight to ten teeth on the outer margin of the hand; these may be the enlarged rugae mentioned above. This specimen lacks the fringe of long hairs mentioned in *P. barbatus*, but it does have short plumose setae.

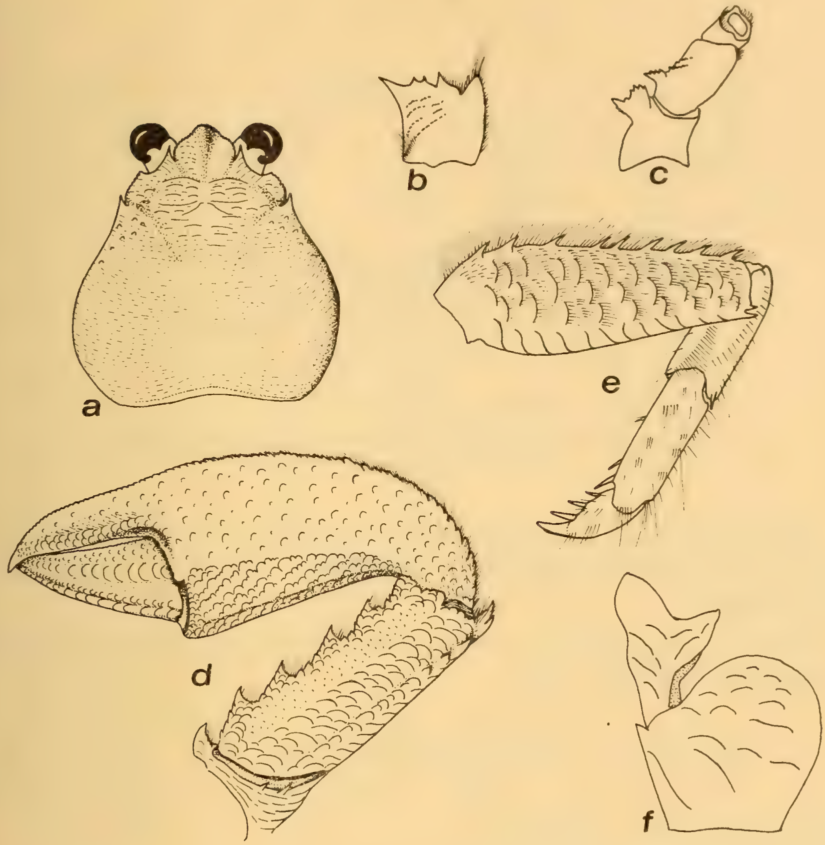

FIG. 8. *Petrolisthes coccineus* (Owen)

a. Carapace in dorsal view; *b.* Antennule; *c.* Antenna; *d.* Right cheliped; *e.* Second pereiopod; *f.* Merus and ischium of maxilliped three.

NATANTIA

Family **Hippolytidae**

Hippolyte ventricosa H. Milne Edwards

Figs 9a–c

Hippolyte ventricosa H. Milne Edwards, Holthuis, 1947: 55 (complete synonymy). Barnard, 1950: 704.

Description: Rostrum two-thirds length of carapace, apically acute, two dorsal teeth, three ventral teeth. Suborbital margin slightly produced and rounded above antennal spine. Third carpal segment of second pereiopod as long as first. Dactyl of pereiopod three with eleven spines.

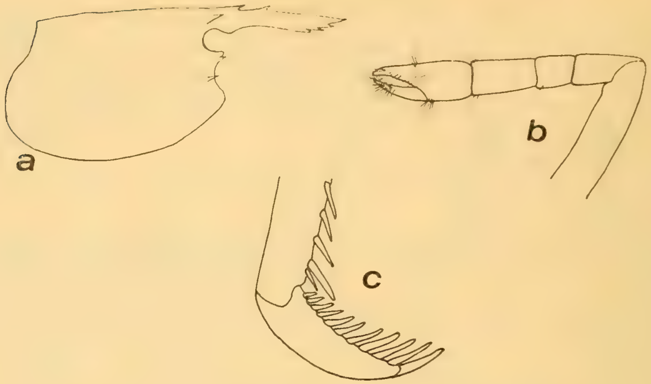

Fig. 9. *Hippolyte ventricosa* H. Milne Edwards
a. Carapace in lateral view; *b*. Chela and carpus of second pereiopod; *c*. Dactyl of third pereiopod.

Previous records: Most of the Indian Ocean region, South Australia and on the East African coast where the southernmost record is the mouth of the Zambesi River.

Material: One ovigerous female, carapace length (excluding rostrum) 2·9 mm, total length 16·0 mm.

Thor amboinensis (De Man)

Figs 10, 11a–e

Thor amboinensis (De Man), Holthuis, 1947: 50.
Thor discosomatis Kemp, 1916: 388; 1925: 330.
Hippolyte amboinensis De Man, 1888: 535.

Description: Carapace moderately inflated, rostrum reaching to middle of antennular peduncle, apically acute, bearing two dorsal spines. Small acute antennal spine, no pterygostomial spine. Stylocerite of basal segment of antennule reaching almost to end of peduncle. Small spine on outer proximal edge of stylocerite, more easily visible in lateral view than in dorsal view. Second segment with outer spine at distal end, third segment with broad movable scale. Antennal scaphocerite twice length of antennular peduncle. Pereiopod one stout, reaching almost to same level as scaphocerite. Second pereiopod reaching to end of third maxilliped, carpus six jointed, proximal two segments short, less obvious than rest of segments. Third pereiopod longest, extending beyond end of maxilliped three, merus with single disto-ventral spine. Dactyls of pereiopods three to five with stout apical and subapical claw, and three spines. Basal segment of pleopods, especially two and three with posterior foliaceous extension. Telson with four pairs of dorso-lateral spines, four pairs of terminal spines of which outermost are shortest.

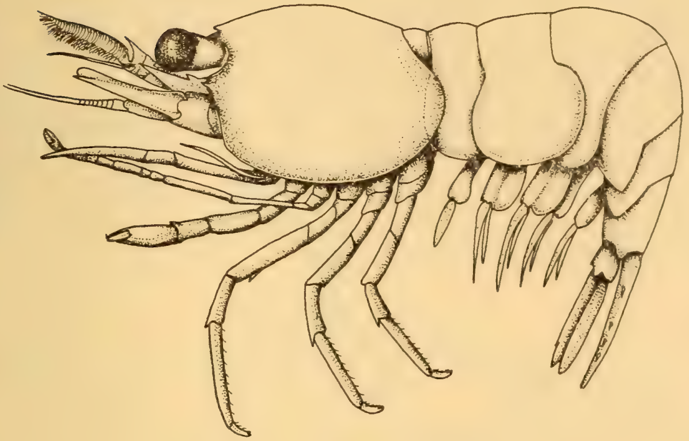

FIG. 10. *Thor amboinensis* (De Man)
Entire animal in lateral view.

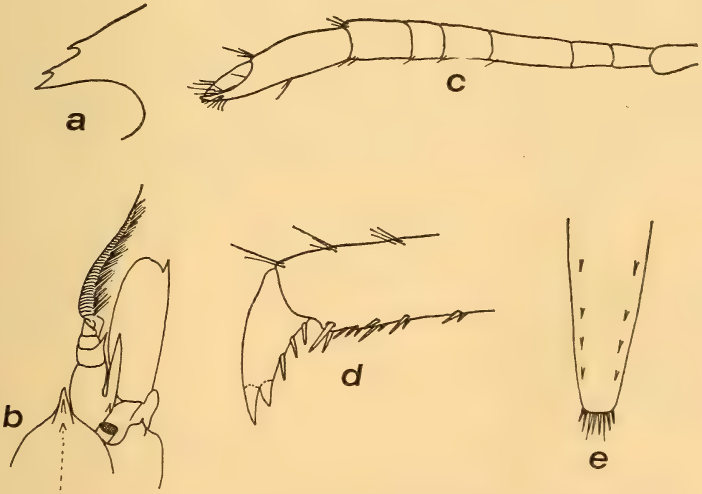

FIG. 11. *Thor amboinensis* (De Man)
a. Rostrum in lateral view; *b.* Anterior region in dorsal view; *c.* Second pereiopod; *d.* Apex of third pereiopod; *e.* Telson.

Previous records: Bay of Bengal, Malay Archipelago, Andaman and Nicobar Islands.

Material: One male, carapace length (including rostrum) 4·0 mm.

Remarks: The genus *Thor* is characterized by a lack of arthrobranchs on the pereiopods, a mandible possessing an incisor process but lacking a palp, a second pereiopod with a six-jointed carpus, no epipods on the pereiopods, and the third antennular peduncle segment with a movable plate at the upper anterior margin. The present specimen agrees well with both Kemp's and Holthuis's descriptions. The only differences exist in the antennular scale, being broader in the present specimen than in Kemp's figure (1916, fig. 1) and in the length of the terminal telson spines.

Family **Alpheidae**

Athanas minikoensis Coutière

Figs 12a–e

Athanas minikoensis Coutière, 1905: 858. De Man, 1911: 149. Barnard, 1950: 731.

Previous records: New Guinea, Maldive and Laccadive Islands, Umtwalumi (Natal).

Material: One male, carapace length (including rostrum) 4·7 mm.

Remarks: The present specimen agrees well with Coutière's and De Man's descriptions and figures, with some slight differences. The larger chela of the male is said to bear one or two teeth on the immobile finger. In the present specimen, this margin is smooth except for two slight bumps. This specimen differs from the male mentioned by Barnard (1950: 731) which has a far more robust right chela, also the teeth of the fingers are more pronounced. These differences may be due to the immaturity of the specimen.

Alpheus luciae Barnard

Figs 13a–b

Alpheus luciae Barnard, 1947: 389; 1950: 755.

Previous record: St. Lucia Bay, Natal.

Material:

	Carapace length (including rostrum)
One ovigerous female	14·7 mm
One male	11·7 mm
Holotype (S.A.M. A8423) . .	11·8 mm

Remarks: The holotype of this species, on re-examination, proved to be a male, the second pleopod bearing an appendix masculina and an appendix interna. This is the first record of the species since it was recorded in 1947.

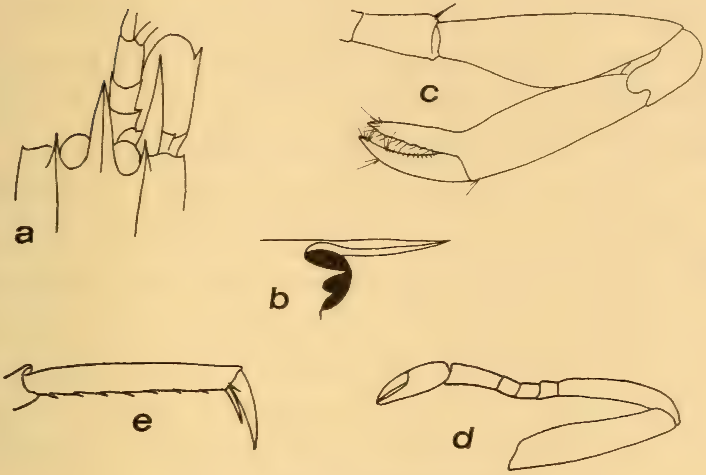

FIG. 12. *Athanas minikoensis* Coutière

a. Anterior region in dorsal view; *b.* Rostrum in lateral view; *c.* Cheliped; *d.* Second pereiopod; *e.* Third pereiopod.

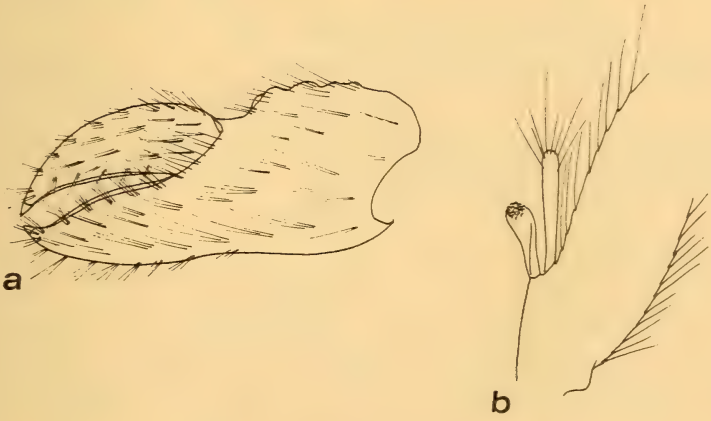

FIG. 13. *Alpheus luciae* Barnard

a. Upper surface of small chela; *b.* Endopod of pleopod two, male, showing appendix masculina and appendix interna.

Alpheus paragracilis Coutière

Figs 14a–e

Alpheus paragracilis Coutière, 1897: 303; 1905: 883. De Man, 1911: 310. Chace, 1966: 627.

Previous records: Tahiti, Djibouti, Maldive and Laccadive Islands, Nosy Bé (Madagascar), Hawaii, St. Helena Island.

Material: One ovigerous female, carapace length 4·9 mm.

Remarks: The presence of an acute tooth on the ventro-distal extremity of the meri of the third and fourth pereiopods, biunguiculate dactyls of the last three pairs of pereiopods, together with the absence of supra-orbital spines, seem to place this specimen in the species *paragracilis* Coutière, which belongs to the *Macrochirus* group of species. The present specimen agrees well in several respects with Coutière's figures (1905, fig. 22) especially in the telson, uropods and third pereiopods. Slight differences exist in the second pereiopods and in the large chela. In Coutière's figure the first segment of the carpus of the second pereiopod is about two-and-a-half times the length of the second, while in the present specimen it is just twice the length. The larger chela agrees in the possession of a notch on the ventral surface. Coutière's figure, however, does not show any dorsal granulation as found in the present specimen. Unfortunately the smaller chela is missing.

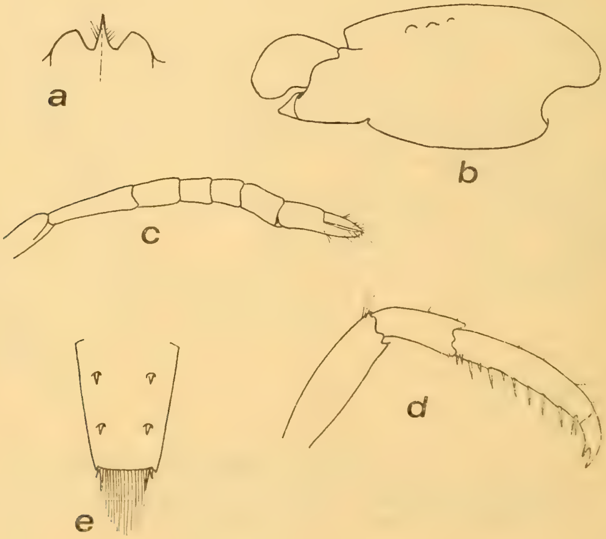

Fig. 14. *Alpheus paragracilis* Coutière
a. Rostrum in dorsal view; *b*. Large chela; *c*. Second pereiopod; *d*. Third pereiopod; *e*. Telson.

General Discussion

The coastal areas of Moçambique have as yet been relatively poorly collected, especially with regard to invertebrate animals. Hilgendorf in 1878 dealt with a small collection of Crustacea collected by Professor W. Peters, while more recently, the late Dr. K. H. Barnard, and the Zoology Departments of the University of the Witwatersrand and the University of Cape Town have also added to our knowledge of the area. Being well within the semi-tropical/tropical region (but nevertheless within the South African region as defined by Barnard (1950: 2)), the Jangamo fauna is rich and varied, and new records and undescribed species are to be expected.

Of the 65 species of decapods collected, all except three are typical of the Indian Ocean region. These are *Porcellana dehaanii*, which has only been recorded from Natal and southern Moçambique; *Alpheus luciae*, which previously was known only from St. Lucia Bay, Zululand; and *Lybia plumosa* previously known only from northern Natal. Only one species in the collection is known from both the east and west coasts of southern Africa. This is *Palaemon pacificus*, which is found in the whole of the Indo-Pacific region and round to northern South West Africa. Twelve species are new records for this part of the African coast, one being a previously undescribed species.

Summary

A collection of 65 species of decapod Crustacea from Jangamo, Moçambique is discussed. Twelve records are of species new to the area; one species is hitherto undescribed.

Acknowledgements

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Example

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THE STATUS OF *GREGARIELLA SIMPLICIFILIS* BARNARD, WITH RECORDS OF MYTILIDAE FROM SOUTHERN ANGOLA

By

BRIAN KENSLEY
&
MARY-LOUISE PENRITH

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By

Brian Kensley

&

Mary-Louise Penrith

South African Museum, Cape Town

(With 3 figures)

[*MS. received* 12 *May* 1970]

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Introduction

In order to complete a survey by the South African Museum and the State Museum, Windhoek, of the intertidal fauna of rocky shores in South West Africa, an expedition was made to the southern coast of Angola (Moçâmedes to the Kunene River mouth) in September 1969. The Mytilidae collected during this expedition proved interesting, particularly from the point of view of comparison with the northern South West African mytilid fauna (Kensley & Penrith, 1970).

Perna perna (Linnaeus) was found to be very common throughout the area of the survey as in northern South West Africa (Kensley & Penrith, 1970). Another species, *Brachydontes puniceus* Gmelin, is also abundant from Cabo Negro northwards. This species replaces *Semimytilus algosus* (Gould) in that it occurs at the same levels of the shore in the same type of habitat as does *Semimytilus algosus* in South West Africa (i.e. at the bases of algal tufts and amongst the byssus threads of *Perna perna* at the lower levels of the shore). In the Angolan collections, *Semimytilus algosus*, although common just north of the Kunene mouth, was represented only by a single juvenile specimen collected at Moçâmedes.

The occurrence in southern Angola, whose fauna includes many Mediterranean elements, of specimens corresponding with *Gregariella simplicifilis* Barnard, 1964, prompted us to investigate further the status of this recently described southern African species. Two other cryptic mytilids were collected

Ann. S. Afr. Mus. **57** (6), 1970: 123–130, 3 figs.

in southern Angola; these three species are discussed below.

The material on which the present work is based included specimens collected in Angola by the South African Museum in 1966. Localities referred to in the text are given with their co-ordinates in table 1.

TABLE 1. Localities referred to in text

Novo Redondo	11°11′S., 13°52′E.
Moçâmedes	15°10′S., 12°10′E.
Cabo Negro	15°40′S., 12°04′E.
Kunene River mouth	17°15′S., 11°45′E.
Rocky Point	18°59′S., 12°29′E.
Möwe Bay	19°20′S., 12°43′E.
Honolulu	20°36′S., 13°18′E.
Torra Bay	20°18′S., 13°15′E.
Gordon's Bay	34°10′S., 18°52′E.
Still Bay	34°23′S., 21°24′E.
Mossel Bay	34°12′S., 22°08′E.
Port Elizabeth	33°58′S., 25°36′E.
Amanzimtoti	30°03′S., 30°53′E.

NOTES ON SPECIES

Modiolus carvalhoi Klappenbach, 1966

Modiolus carvalhoi Klappenbach, 1966: 251, figs 1–5, 7, 8. Kensley & Penrith, 1970: 21, fig. 5.

Material

Catalogue No.	*Size range (mm)*	*Locality*	*Date*
S.A.M. A31381	5·2, 10·6	Praia das Conchas, Moçâmedes	July 1966
S.A.M. A31382	2·5	Praia das Conchas, Moçâmedes	10 September 1969
S.A.M. A31383	11·8	Rocks 15 km north of Kunene R. mouth	23 September 1969

Remarks

The Angolan specimens agree well with the South West African specimens, and were found in similar habitats.

Gregariella barbatella (Cantraine, 1835)

Modiolus sulcatus (*non* Lamarck), Risso, 1826: 324.
Modiolus barbatellus Cantraine, 1835: 397.
Modiolaria (*Gregariella*) *barbatella:* Lamy, 1937: 32 (synonymy and references).
Modiolaria barbatella: Nicklès, 1950: 170, fig. 319; 1955: 127.
Gregariella simplicifilis Barnard, 1964: 402, fig. 9 e–f. Kensley & Penrith, 1970: 23.

Material

Catalogue No.	*Size range (mm)*	*Locality*	*Date*
S.A.M. A31375	4·1–5·3	Cabo Negro	16 September 1969

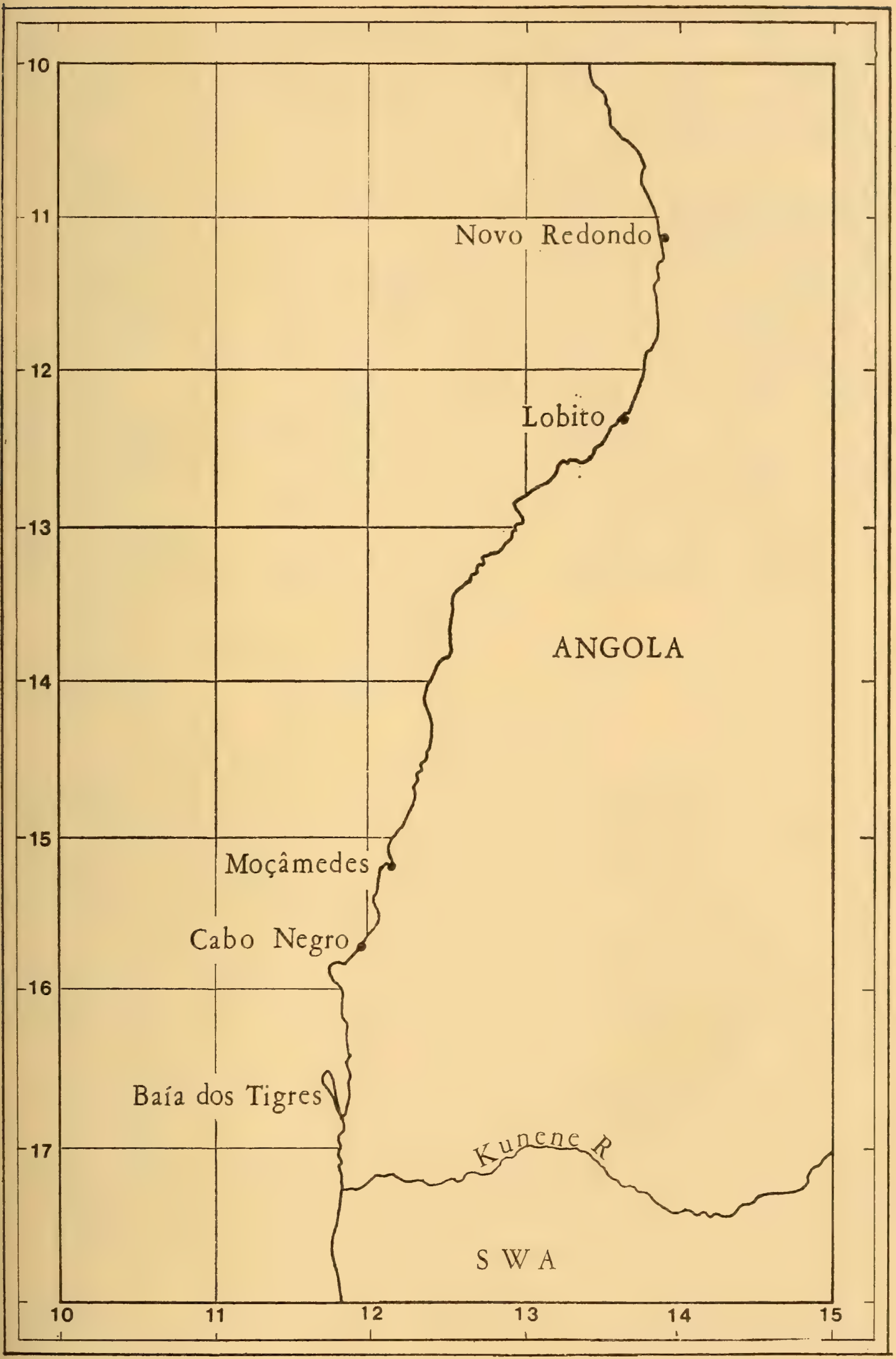

Fig. 1. Map of area of survey

Material used for comparison

Catalogue No./ Institution	*Size range (mm)*	*Locality*	*Date*
Muséum National d'Histoire Naturelle, Paris	9·8–11·1	Marseille	1892
S.A.M. 6878 (type series of *Gregariella simplicifilis*)	8·8–11·9	Gordon's Bay	1901
S.A.M. A7642	6·1–12·0	False Bay	1930
S.A.M. A31376	1·2–9·8	Still Bay	—
S.A.M. 2472	10·5	Mossel Bay	1898
S.A.M. A31377	8·9–10·2	Port Elizabeth	—
S.A.M. A31378	11·3	Amanzimtoti, Natal	26 March 1938
S.A.M. A31209	6·6	6–8 km south of Kunene R. mouth	3–4 October 1968
S.A.M. A31210, State Museum M259	4·3, 7·2	Honolulu, S.W.A.	9 November 1968
S.A.M. A31297	3·6–6·8	Möwe Bay, S.W.A.	31 May–3 June 1969
S.A.M. A31298	7·0	Rocky Point, S.W.A.	15 June 1969
S.A.M. A31305	9·7	Torra Bay, S.W.A.	29 May 1969

Remarks

Barnard (1964) gave the name *Gregariella simplicifilis* to a species of mytilid occurring on the South African coast from Cape Town to Natal. He distinguished the species from the Mediterranean species by its simple periostracal hairs. Kensley & Penrith (1970) recorded specimens of *Gregariella* with simple periostracal hairs from the northern coast of South West Africa, which they placed in *Gregariella simplicifilis* Barnard.

Subsequent comparison of South African, South West African, and Angolan material with specimens from Marseille indicates that the southern forms of *Gregariella* are not distinct from the Mediterranean species *Gregariella barbatella* (Cantraine, 1835).

The specimens from Cabo Negro agree well with Barnard's (1964) description and type specimens, and with Lamy's (1937) description of *Gregariella barbatella*, as well as with the three specimens from Marseille. Lamy (1937) mentioned long, compactly arranged periostracal hairs but did not state that these were branched. Nicklès's (1950) figure shows *Gregariella barbatella* with simple periostracal hairs. It seems probable that Barnard was confused by Soot-Ryen's (1955) discussion of the nomenclature of the species, in which he suggested that the name *Modiolus opifex* Say, 1825, should probably be applied to the Mediterranean species, although it has subsequently been used for an American species with strongly branched periostracal hairs. It seems likely that Barnard interpreted this as meaning that the Mediterranean species also had branched periostracal hairs; Soot-Ryen (1955) did not in fact state that it had. In view of the similarity between the Angolan, South West African, South African, and Mediterranean specimens, we feel that *Gregariella simplicifilis* Barnard should become a synonym of *Gregariella barbatella* (Cantraine).

The nomenclature of *Gregariella barbatella* is rather confused. Dautzenberg (1910), followed by other authors, e.g. Lamy (1937), proposed the use of Cantraine's (1835) name, *barbatella*, for this species in preference to the older name *sulcatus* Risso, 1826, as the latter name was preoccupied by a species in the same family. Soot-Ryen's (1955) suggestion that the name *opifex* should be used does not seem feasible in view of the general confusion surrounding the use of that name. At present it seems preferable to retain the name *Gregariella barbetella* for the Mediterranean/African species.

The distribution of *Gregariella barbatella* is remarkable; however, dispersal is no great problem for attached, cryptic species. An analysis of temperature data in relation to distribution of this species would almost certainly prove highly significant.

Gregariella sp.
(Fig. 2)

Material

Catalogue No.	*Size (mm)*	*Locality*	*Date*
S.A.M. A31379	8·1	Novo Redondo	11 July 1966

Description

Shell elongate, inflated. Dorsal margin straight. Umbo subterminal. Lunule distinct. Antero-dorsal angle about 90°, postero-dorsal angle broadly obtuse. Posterior margin smoothly convex. Ventral margin slightly convex. Anterior margin very short, distinctly convex, extending markedly in front of the umbo. Hinge without teeth. Inner surface nacreous, muscle scars fairly distinct. Entire shell covered with a thick, brown periostracum produced into numerous hairs over the whole region postero-dorsal to the umbo and the low rounded umbonal carina. Hairs immediately posterior to umbo and along umbonal carina simple; hairs above and behind these regions branched (fig. 2). Lunule with crenulate radiating ribs; faint radial sculpture in region of umbonal carina. Ligament occupying about seven-eighths of dorsal margin. Inner edge immediately behind ligament with faint irregular crenulations; anterior margin internally with fourteen strong, slightly elongate crenulations. Byssus threads very fine and silky.

Remarks

This specimen differs from all other specimens of *Gregariella* examined in the nature of the periostracal hairs, as well as in the more acutely produced

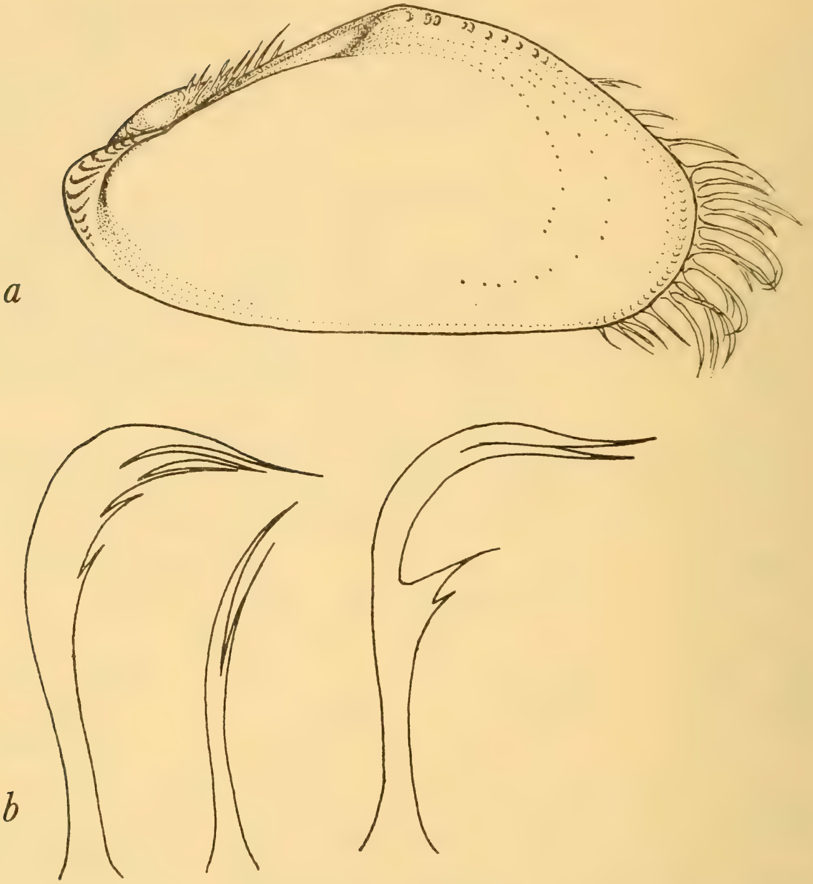

FIG. 2. a. Internal view of *Gregariella* sp. b. Periostracal hairs of *Gregariella* sp., enlarged

anterior region and the weakness of the crenulations on the posterior dorsal margin. The muscular system agrees well with that of specimens of *Gregariella barbatella*, as does the sculpture of the lunule and the posterior part of the shell.

In view of the fact that only one specimen showing the branched hairs and other divergent features was available, we give this description and figure in the hope that with a larger range of comparative material it may be able to be placed.

Lithophaga aristata (Solander, 1807)

(Fig. 3)

Lithophaga aristata: Nicklès, 1955: 128 (synonymy and references). Franca, 1960: 29.

Material

Catalogue No.	*Size range (mm)*	*Locality*	*Date*
S.A.M. A31380	5·8–30·4	Praia das Conchas, Moçâmedes	10–14 September 1969

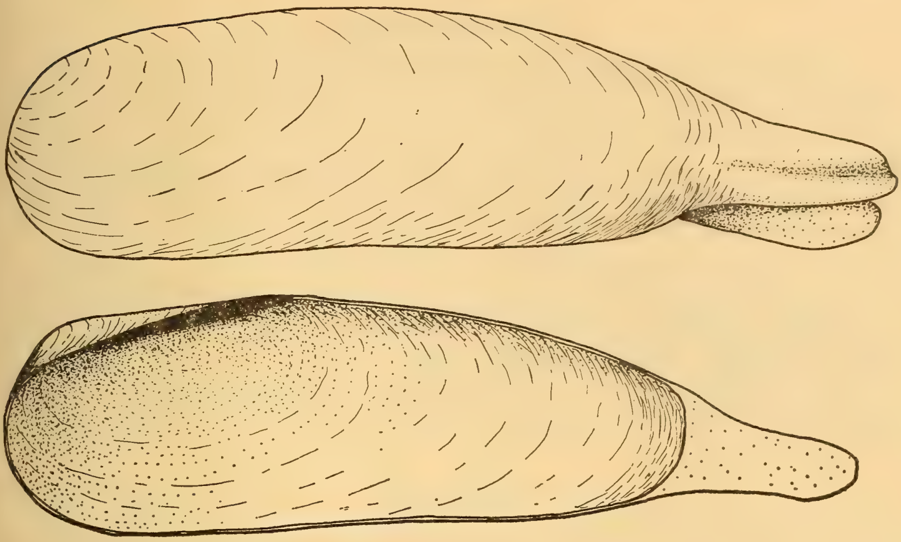

Fig. 3. *Lithophaga aristata* (Solander)

Remarks

Lithophaga aristata was found to be very common, boring between the tubes of the mollusc *Vermetus adansoni* Daudin, which cover the rocks at the lower levels of the shore at Praia das Conchas, Moçâmedes.

Discussion

A comparison of the mytilid faunas of southern Angola and northern South West Africa indicates that the occurrence of *Perna perna* and the cryptic species *Modiolus carvalhoi* and *Gregariella barbatella* are the same on the two adjacent stretches of coast. However, from Cabo Negro northwards, *Semimytilus algosus* is replaced by *Brachydontes puniceus.*

The coast of Angola south of Moçâmedes is mainly sandy or consists of vertical sandstone cliffs dropping sharply into the sea, so that the development of an extensive rocky intertidal fauna is discouraged. This inhospitable stretch of coast may assist existing temperature barriers in inhibiting the southward and northward spread of species.

Summary

The mytilid fauna of southern Angola is compared with that of northern South West Africa. *Gregariella simplicifilis* Barnard is synonymized with *Gregariella barbatella* (Cantraine). A description and figure are given of a specimen of *Gregariella* from Novo Redondo which could not be placed in any existing species.

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(With 7 figures and 1 table)

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Introduction

A collection of termitophilous isopods taken over the last seven years by Dr. W. G. H. Coaton and colleagues of the Plant Protection Institute, Pretoria, was submitted to the South African Museum for identification. The isopods have been collected from several localities in the Karoo and Namaqualand, Cape Province, and also from South West Africa. The localities involved may be seen in Figure 1. Seven species of termites are involved as hosts to the isopods. The present paper is intended merely as a systematic account of the specimens taken, as biological data concerning these unusual animals are scarce. Holotypes and allotypes are housed in the South African Museum, and are given S.A.M. catalogue numbers. Paratypes have been divided between the South African Museum, Cape Town, and the National Collection of Insects, Pretoria. The latter specimens are designated with 'T' numbers. Where available, duplicate material has also been donated to the Muséum National d'Histoire Naturelle, Paris.

Description of the Material

Suborder ONISCOIDEA

Tribe **SYNOCHETA**

Superfamily STYLONISCOIDEA

Family **Titaniidae**

Titana mirabilis Budde-Lund

Titana mirabilis Budde-Lund, 1909: 65. Barnard, 1932: 208. Vandel, 1952*a*: 86.

Ann. S. Afr. Mus. **57** (7), 1971: 131–147, 7 figs, 1 table.

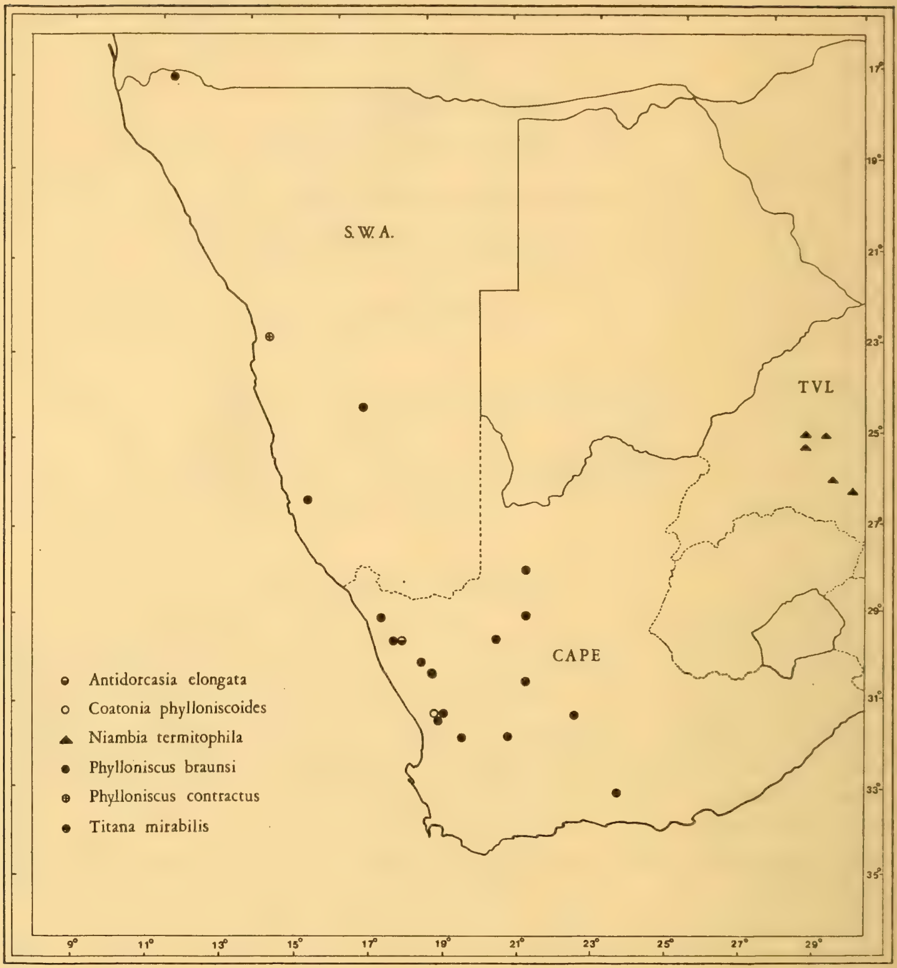

Fig. 1. Map showing collecting localities.

Material

Cat. No.	*No. Specimens*	*Locality*	*Host species*
T694	1 ♂	Vanrhynsdorp	*Microhodotermes viator*
T695	3 ♀	Vanrhynsdorp	*Microhodotermes viator*

Phylloniscus braunsi Purcell
Fig. 2

Phylloniscus braunsi Purcell, 1903: 409. Barnard, 1932: 206.
Phylloniscus braunsi var. *eutheles* Barnard, 1932: 207.

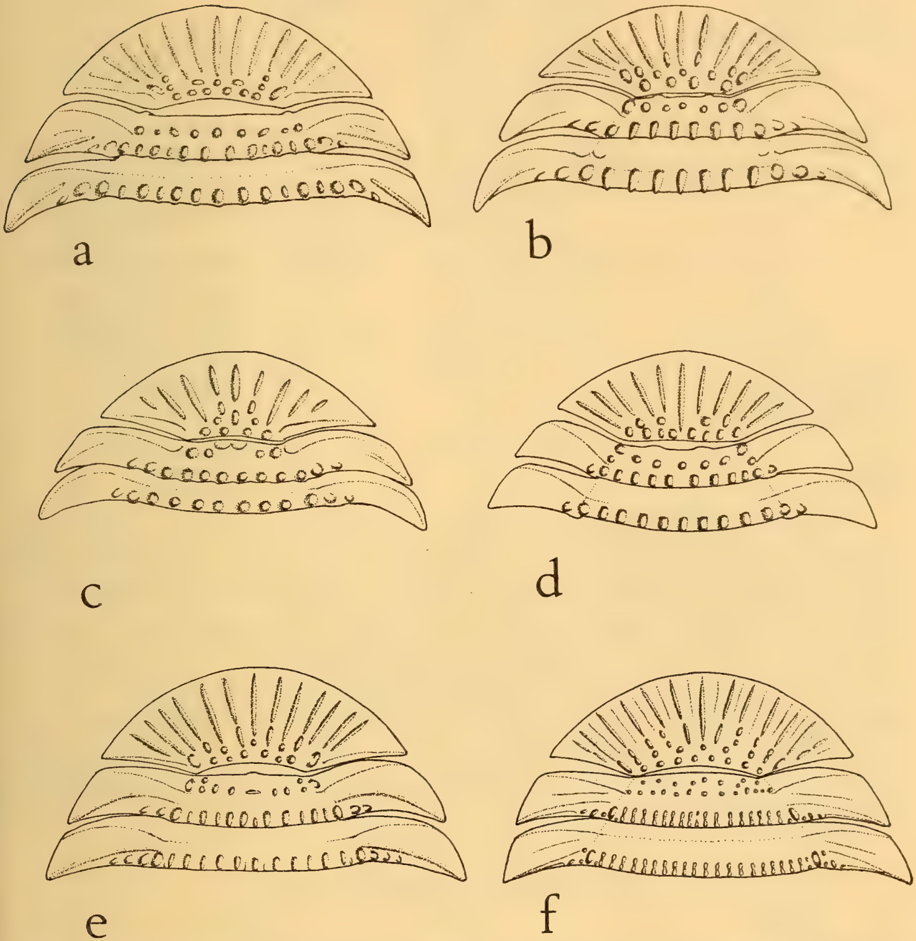

Fig. 2. *Phylloniscus braunsi*. Head and first two thoracic segments in dorsal view showing variation.

Material

For convenience the available material has been divided into six arbitrary groups, corresponding to Figure 2 *a–f*, to give some idea of some of the variation in the species. Figure 2*a* is of the holotype, Figure 2*b* that of the variety *eutheles*.

Host Species	*Form* (*Fig.* 2)	*Cat. No.*	*Specimens*	*Locality*
Hodotermes mossambicus	d	T99	2 ♀	Kenhardt, C.P.
	d	T100	1 ♀	Kenhardt, C.P.
	e	T357	5 ♂	Maltahöhe, S.W.A.
Macrotermes subhyalinus	c	T479	3 ♀	Epupa Falls, S.W.A.

Host Species	*Form*	*Cat. No.*	*Specimens*	*Locality*
Microhodotermes viator	d	T97	1 ♂	Williston, C.P.
	d	T98	1 ♀	Mertenhof, C.P.
	d	T196	1 ♂ 3 ♀	Williston, C.P.
	d	T198	2 ♀	Williston, C.P.
	d	T199	1 ♀	Beaufort West, C.P.
	d	T699	1 ♂	Vanrhynsdorp, C.P.
	d	T746	2 ♂ 1 ♀	Bitterfontein, C.P.
	f	T353	2 ♂ 2 ♀	Aus/Lüderitzbucht, S.W.A.
	f	T740	4 ♂ 1 ♀	Springbok, C.P.
	f	T763	1 ♀	Steinkopf, C.P.
Trinervitermes trinervoides	d	T747	3 ♂ 2 ♀	Garies, C.P.
	d	T750	3 ♀	Garies, C.P.

Remarks

From the present material, it can be seen that this species is widely distributed through the Cape Province and South West Africa. The type locality is Willowmore, C.P., while the variety *eutheles* was described from Upington, C.P., and differed from the type in dorsal sculpturing. It would seem that the species is variable with regard to the pattern and the number of dorsal tubercles. By far the commonest is that of the Namaqualand–Karoo form, but at least five other patterns may be distinguished. No differences in mouthparts or other appendages could be detected in these forms, and the erection of subspecies could not be justified. These variations are probably due to the semi-permanent isolation of scattered populations.

Phylloniscus contractus n. sp.

Fig. 3

Description

Body twice longer than wide, evenly oval in outline, bearing numerous scattered scales. Head dorsally flattened, with several rounded and elongate tubercles, anterior margin semicircular, lateral corners acute, completely covering antennae when latter folded. First pereion segment, anterior margin with row of six small tubercles. Posterior third of segment demarked by slight ridge, forming a broad band bearing row of eight broad elongate tubercles. Pereion segments two to seven each with posterior band bearing row of 10 elongate tubercles. More posterior segments have the tubercles posteriorly pointed. Epimera of segments one to seven well separated, each bearing slightly curved ridge in anterior portion. Pleon segments one and two short, narrow, having no free epimera, each bearing row of four slightly elongate posteriorly pointed tubercles, some indication of lateral tubercles, each with free epimerite. Telson apically having two rounded lobes, laterally concave. First antenna

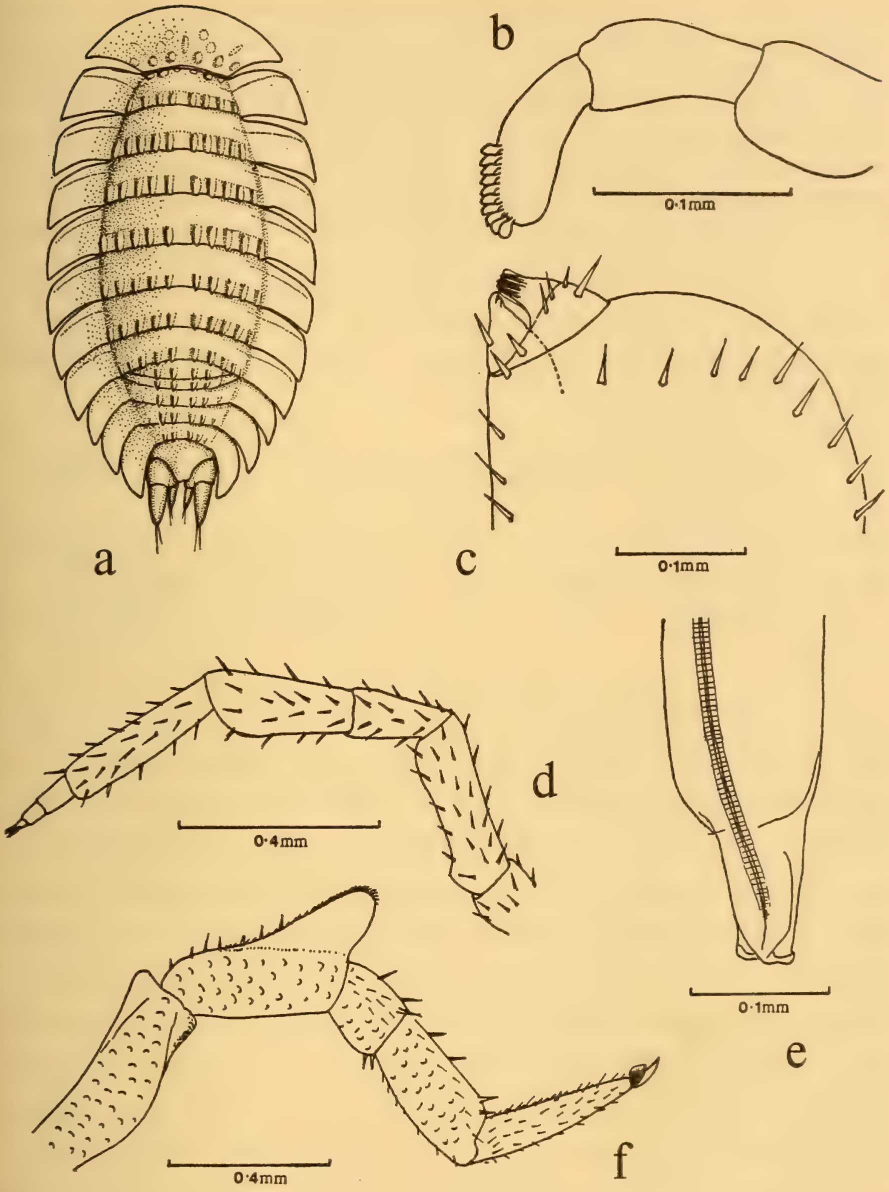

Fig. 3. *Phylloniscus contractus*

- *a.* Holotype in dorsal view.
- *b.* First antenna.
- *c.* Maxilliped.
- *d.* Second antenna.
- *e.* Apex of inner ramus, second pleopod, male.
- *f.* Seventh pereiopod, male.

curved, three-segmented, two distal segments equal in length, terminal segment bearing regular row of aesthetascs. Second antenna terete, with five large basal segments, flagellum of three small segments. Left mandible bearing two penicils, right bearing one, no molar penicils present. First maxilla with inner lobe apically setose, bearing two setose penicils, upper smaller than lower. Outer lobe bearing three large simple spines, three slender spines, two very slender penicils terminally. Second maxilla consisting of single apically setose lobe. Maxilliped bearing short palp, latter curved over endite, bearing several spines and terminal brush of setae. Endite reduced, lacking terminal penicil. Dactyls of all pereiopods bearing fine lamellar dactylar organ as in *P. braunsi*. Genital apophysis lanceolate. First pleopod male as in *P. braunsi*, second pleopod male apically more slender than in latter species. Uropod outer ramus twice length of inner, both terete.

Material

	Cat. No.	*Specimens*	*Length* (mm)	*Locality*	*Host Species*
Holotype	S.A.M. A12832	1 ♂	5·9	19 km *ex* Swakopmund	*Hodotermes mossambicus*
Allotype	S.A.M. A12833	1 ovig ♀	5·1	19 km *ex* Swakopmund	*Hodotermes mossambicus*

Remarks

The present specimens are placed in the genus *Phylloniscus* because of the similarity in the maxilliped, the first antennae, first and second pleopods telson with *P. braunsi*, hitherto the only species of the genus. Several differences however seem to warrant the separation of a new species. The most obvious of these differences is the body shape, the present species being oval/elongate unlike the almost circular *P. braunsi*. *P. contractus* is also more convex dorsally, the head lacks elongate tubercles, the second antenna bears almost spinose setae, the ischial lobe of pereiopod seven in the male is not as spinose as in the previous species, the inner uropod ramus is not lamellar. Pleopod two of the male is apically more slender. Why there should be one species of the genus near Swakopmund, while from the Kunene River in the north to Namaqualand and the Karoo in the south one variable species is to be found, is open to discussion. Dr. Coaton (personal communication) states that there is no isolation of the termite host species, as colonies of *H. mossambicus* occur from the coast, through Pronamib/Namib desert country, right into the escarpment and inland plateau. The possibility does exist that a particular species of *Phylloniscus* is able to survive in the Namib conditions, where *P. braunsi* would be less well adapted. Until more intensive collecting can be done, further speculation will be of little use.

COATONIA n. gen.

Eyes absent, head produced over bases of second antennae. Body circular, depressed. Epimera of first pereion segment embracing head. Pleon not much narrower than pereion. Mandibles with well-developed molar process. Right mandible with one penicil, left with two; no molar penicil present. Inner lobe of first maxilla with three penicils. Maxilliped with broad exopodite, palp with terminal setal brush, endite with terminal penicil. Second antenna with fourth and fifth peduncle segments prominent, flattened, flagellum three-segmented. Pereiopods six and seven in male bearing modifications. Body and appendages covered with minute semicircular scales, those on appendages sometimes thorn-like.

Coatonia phylloniscoides n. sp.

Figs 4, 5

Description

Body circular in outline, dorso-ventrally flattened, unpigmented, covered with numerous minute scales. Head embraced by epimera of first pereion segment, bearing ten rounded tubercles in the posterior half. First four pereion segments bearing anterior row of circular tubercles (up to 12/segment) and posterior row of elongate tubercles (up to 11/segment). Each epimerite bearing single proximal tubercle. Anterior row of circular tubercles decreasing in number posteriorly, one on first pleon segment. Posterior row of tubercles present on all segments except last pleon segment. First antenna three-segmented, terminal segment bearing eight or nine aesthetascs. Second antenna flattened, especially fourth and fifth segments. Flagellum of three segments, about one-third length of fifth peduncle segment. Left mandible with two penicils at base of lacinia mobilis, no molar penicil. Right mandible with lacinia mobilis reduced, single penicil at its base, no molar penicil. Inner lobe of first maxilla bearing three distal penicils, terminal penicil bulbous. Outer lobe bearing nine or ten chitinous teeth plus one slender penicil. Second maxilla lamellar, inner terminal lobe with numerous fine and several stout setae. Maxilliped having broad spinose epipodite, palp of fused segments, distally tapering, bearing brush of stiff setae terminally, endite with three distal spines, plus single terminal penicil. Pereiopods covered with flat semicircular scales, numerous split spines, particularly on ventral surfaces. Very delicate dactylar organ present. Pereiopods six and seven differentiated in male. Sixth with dense brush of fine setae on disto-dorsal surface of propodus. Seventh pereiopod with ischium having hooked leaf-shaped lobe proximo-ventrally, ventral surface extended to form broad lobe, apex of which bearing numerous fine setae. First pleopod male with elongate triangular lamellar exopod. Endopod with stout basal segment, and slender tapering distal segment. Lanceolate genital apophysis situated between first pleopods. Endopod of second pleopod elongate, stout, with complex convoluted terminal portion. Third to fifth pleopods with quadrate exopods and much smaller roughly quadrate endopods. Telson broadly triangular, apically rounded. Uropod with stout base, exopod terete, slightly tapering, with two terminal setae. Endopod inserted at same level as exopod, terete tapering, little shorter than exopod, with two terminal setae.

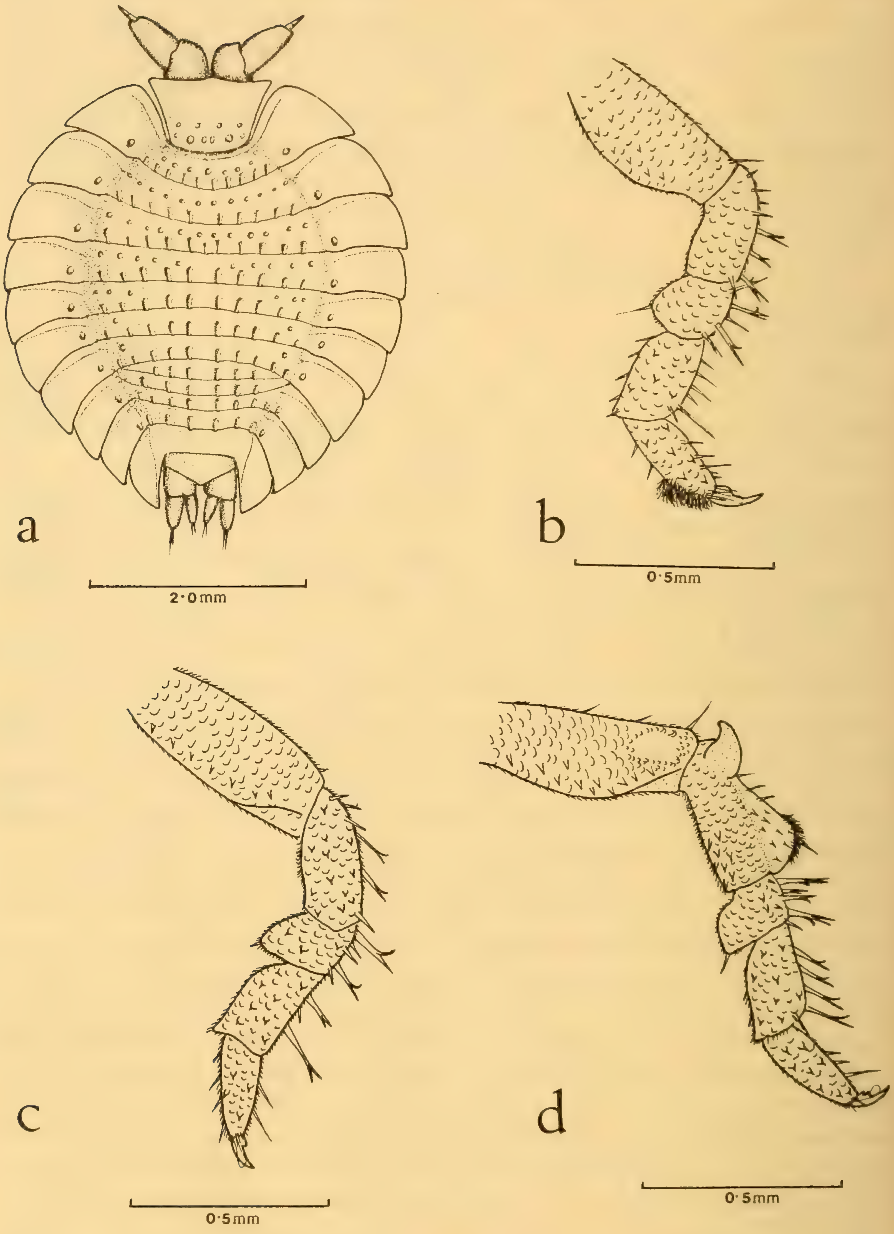

Fig. 4. *Coatonia phylloniscoides*
a. Holotype in dorsal view.
b. Sixth pereiopod, male.
c. Seventh pereiopod, female.
d. Seventh pereiopod, male.

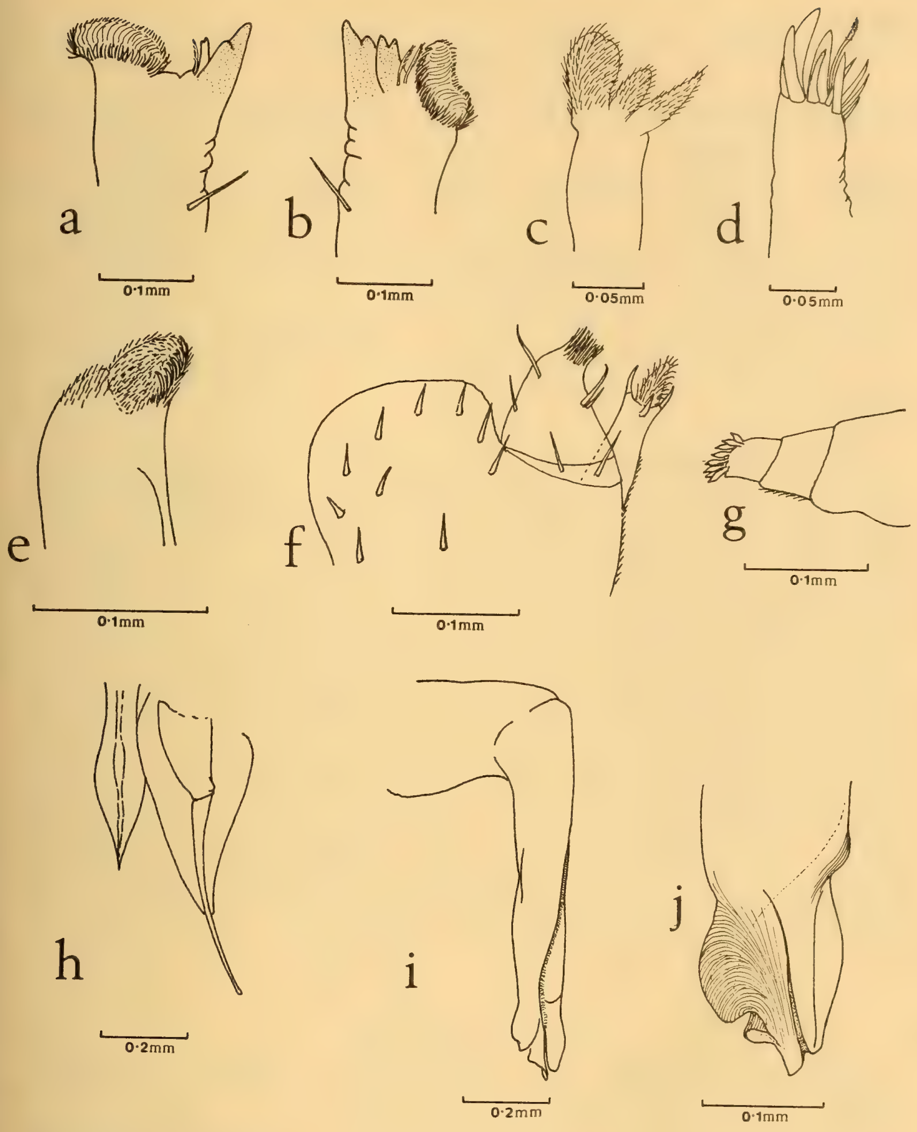

Fig. 5. *Coatonia phylloniscoides*

- *a.* Right mandible.
- *b.* Left mandible.
- *c.* Inner lobe of first maxilla.
- *d.* Outer lobe of first maxilla.
- *e.* Second maxilla.
- *f.* Maxilliped.
- *g.* First antenna.
- *h.* Genital apophysis and first pleopod, male.
- *i.* Inner ramus of second pleopod, male.
- *j.* Apex of inner ramus of second pleopod, male.

Material

	Cat. No.	*Specimens*	*Length* (mm)	*Locality*	*Host Species*
Holotype	S.A.M. A12829	1 ♂	3·1	Vanrhynsdorp	*Microhodotermes viator*
Allotype	S.A.M. A12830	1 ovig ♀	3·2	Vanrhynsdorp	*Microhodotermes viator*
Paratypes	S.A.M. A12831	6 ♂ 4+11 ovig ♀	2·8–3·0 3·0–3·2	Vanrhynsdorp	*Microhodotermes viator*
Paratypes	T694	2 ♂ 2+14 ovig ♀	2·8 2·8–3·2	Vanrhynsdorp	*Microhodotermes viator*

Remarks

Of the known genera of the Titaniidae from southern Africa, the present species most closely resembles *Phylloniscus*, also a termitophilous genus. The general shape, the first pleopod and genital apophysis of the male of both genera are very similar, as are the rest of the pleopods. *Coatonia* differs from *Phylloniscus* in that the first pereion segment embraces the head, also in the structure of the maxillae and maxilliped, and the inner ramus of the uropod. The first antenna, although three-segmented, differs in proportion and in the shape of the aesthetascs. The very distinctive structure of the head immediately separates *Coatonia* from *Phylloniscus*. In the latter the slender terete antennae are usually hidden by the head, whereas in the present species the second antennae are strikingly obvious, rather as in *Schoeblia*. The latter genus, of the family Schoebliidae, however, differs considerably in antennal and mouthpart structure. The maxilliped of *Coatonia* has a well-developed palp and endite, unlike the reduced maxilliped of *Phylloniscus*. The genus is named for Dr. W. G. H. Coaton, who was responsible for much of the collecting of the material and for making the collection available for identification.

ANTIDORCASIA n. gen.

Body oval, twice longer than broad. Head with anterior margin semicircular, covering bases of antennae, lacking eyes. Mandibles and maxillae as in *Phylloniscus*. Maxilliped endite well developed, with two distal spines and terminal penicil. Pereiopod seven differentiated in male, bearing low rounded spinose lobe. Uropod with endo- and exopod both terete.

Antidorcasia elongata n. sp.

Fig. 6

Description

Body oval, twice longer than broad, central portion strongly convex. Head semicircular in outline, bearing cluster of rounded tubercles, not embraced by

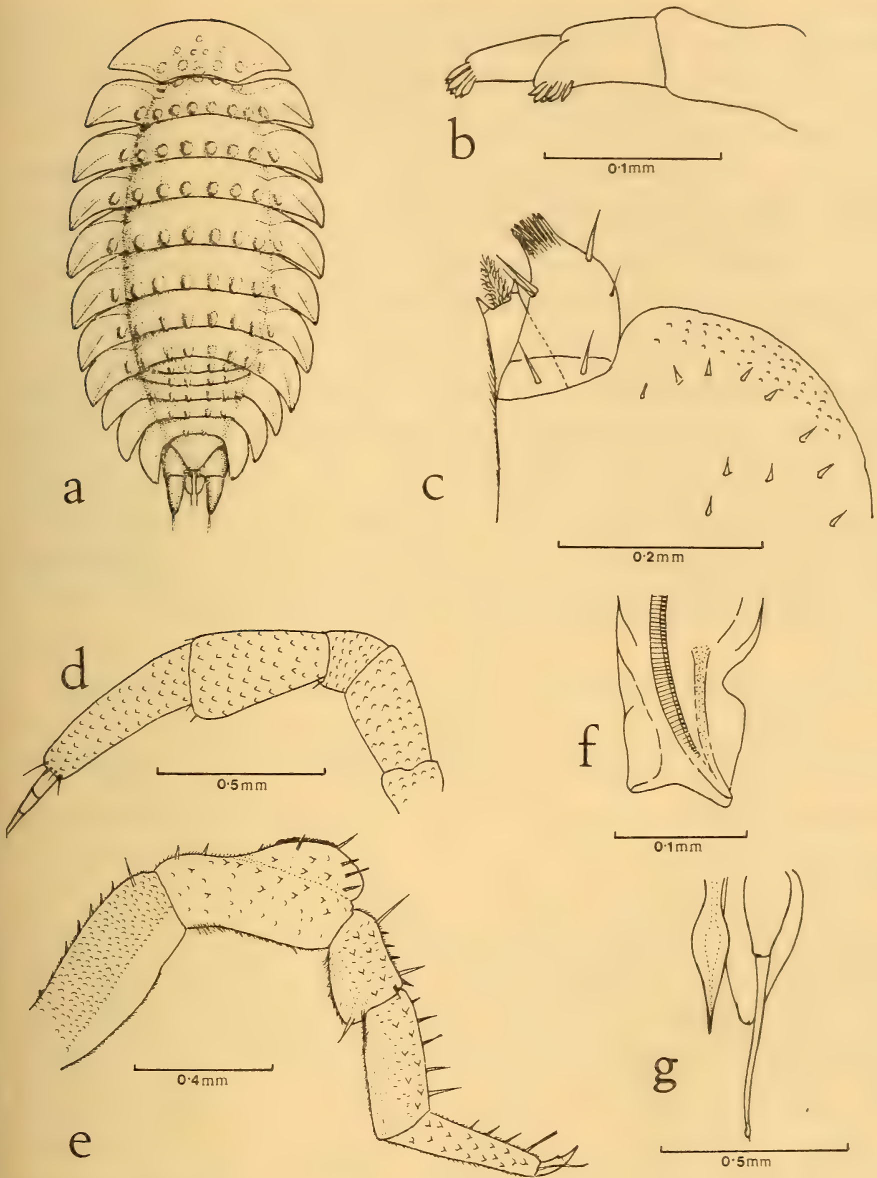

Fig. 6. *Antidorcasia elongata*

- *a.* Holotype in dorsal view.
- *b.* First antenna.
- *c.* Maxilliped.
- *d.* Second antenna.
- *e.* Seventh pereiopod, male.
- *f.* Apex of inner ramus of second pleopod, male.
- *g.* Genital apophysis and first pleopod, male.

epimera of first pereion segment. Latter bearing anterior row of five rounded tubercles, eight posterior rounded tubercles. Epimera each bearing single diagonal elongate rib. Pereion segments two to seven each bearing eight posterior rounded tubercles. First two pleon segments each with four pointed tubercles, third with six, fourth with four, fifth with two. Telson slightly broader than long, apically rounded. First antenna three-segmented, basal segment largest, subterminal and terminal each bearing cluster of aesthetascs. Second antenna with five basal segments, fifth largest, covered with numerous flattened scales. Flagellum of three small segments. Left mandible bearing one penicil, right two, no molar penicils. First maxilla inner lobe with three setose penicils, terminal one rounded. Outer lobe with several simple spines. Second maxilla apically setose. Maxilliped with spinose epipodite, palp bearing several spines and terminal cluster of setae. Endite shorter than palp, bearing two distal spines and large terminal setose penicil. Pereiopods spinose, covered with flattened scales. Seventh pereiopod male bearing low, rounded ischial spinose lobe. Dactyls of pereiopods with fine dactylar organ. First pleopod in male with bipartite endopod, basal segment short, stout, terminal segment slender, apically slightly flattened, with single very fine terminal seta. Genital apophysis lanceolate. Endopod of second pleopod in male with broad terminal portion. Uropod with inner ramus less than half length of outer, both terete.

Material

	Cat. No.	*Specimens*	*Length* (mm)	*Locality*	*Host Species*
Holotype	S.A.M. A12834	1 ♂	5·6	Springbok	*Microhodotermes viator*
Allotype	S.A.M. A12835	1 ♀	5·5	Springbok	*Microhodotermes viator*

Remarks

The present species is very closely related to both *Coatonia* and *Phylloniscus*. All three genera have a similar flattened body with dorsal sculpturing, almost identical mandibles, maxillae and first pleopods and genital apophysis in the male. The maxilliped is as in *Coatonia*, and differs from *Phylloniscus* in possessing a setose penicil. The species is separated from the almost circular *Coatonia* in the oval-elongate shape, the slender second antennae, the structure of the 6th and 7th pereiopods in the male. Although in general shape and to some extent in dorsal sculpturing the present species resembles *Phylloniscus contractus*, it differs in several respects. The maxilliped structure is as in *Coatonia*, the first antenna differs in the proportions of the segments and in the disposition of the aesthetascs, the seventh pereiopod of the male has an ischial lobe much lower and broader than in *Phylloniscus*, all the pereiopods lack the lamellar dactylar organ, the endopod of the uropod is terete and not lamellar. Thus, although the present species closely resembles both *Coatonia* and *Phylloniscus*, it is placed in a separate genus as it fits neither of the former generic definitions completely.

Tribe **CRINOCHETA**
Superfamily ATRACHEATA
Family **Squamiferidae**
Niambia **(*Niambia*)** ***termitophila*** n. sp.

Fig. 7

Description

Body elongate, bearing many scattered scales, with reticulate purplish dorsal pattern. Head discrete, trilobed in dorsal view. Epistome not bulbous. Eyes with seven or eight ocelli. Frontal line ridge-like between eyes. First antenna three-segmented, terminal segment longest, with terminal aesthetascs. Second antenna peduncle four-segmented, third segment distinctly shorter than fourth, flagellum two-segmented, entire appendage covered with scales. Left mandible with tridentate incisor process, tridentate lacinia mobilis. Molar process consisting of compound penicil. Right mandible with tridentate incisor process, reduced tridentate lacinia mobilis with single penicil at base, single penicil between lacinia mobilis and molar process. Latter consisting of several penicils. Inner lobe of first maxilla bearing two stout setose penicils, outer lobe with eight terminally simple spines. Second maxilla with small rounded inner lobe, larger and broader outer lobe. Former with numerous short terminal spines. Maxilliped, endite with stout seta near inner angle, palp with two subterminal setae, and terminal brush of setae.

First pereion segment with antero-lateral extension reaching forward to head. Pereion almost parallel-sided. Pereiopods lacking any secondary differences in male. All pereiopods with numerous spinelike setae on ventral surfaces of dactyli, propodi, and carpi. Propodus and carpus each with two dorso-distal spines. Pleon only slightly narrower than pereion, epimerites curved, acute. Telson apically acute, sides concave, broader than long, fringed with alternating large and small scales. Outer ramus of first pleopod in male cordiform, inner ramus elongate tapering with genital apophysis fitting between median edges. Genital apophysis apically broadened, truncate. Outer ramus of second pleopod triangular, inner ramus elongate, tapering to needle-like point. Pleopods three to five with outer rami cordiform, inner rami roughly circular. Uropods with basal segment square, shorter than outer ramus; latter inserted at apex of basal segment, inner ramus inserted in more proximal position, slender.

Material

	Cat. No.	*Specimens*	*Length* (mm)	*Locality*	*Host Species*
Holotype	S.A.M. A12826	1 ♂	5·2	Pretoria	*Macrotermes vitrialatus*
Allotype	S.A.M. A12627	1 ♀	5·0	Pretoria	*Macrotermes vitrialatus*
Paratypes	S.A.M. A12828	50 ♂♂ 7 ovig ♀♀	2·0–4·9 2·8–4·8	Pretoria	*Macrotermes vitrialatus*

	Cat. No.	*Specimens*	*Length*	*Locality*	*Host Species*
Paratypes	N.C.I.	41 ♂♂ 10 ovig ♀♀	2·4–4·6 3·2–4·0	Pretoria	*Macrotermes vitrialatus*
	T44	24 ♂♂ 1 ovig ♀		Rust der Winter	*Macrotermes vitrialatus*
	T135	28 ♂♂ 1 ovig ♀		Pretoria	*Macrotermes vitrialatus*
	T159	1 ♂		Bethal	*Trinervitermes trinervoides*
	T179	2 ♂		Pretoria	*Macrotermes vitrialatus*
	T279	18 ♂♂ 4 ovig ♀♀		Pretoria	*Macrotermes vitrialatus*
	T283	2 ♂♂		Pretoria	*Odontotermes transvaalensis*
	T319	22 ♂♂ 5 ovig ♀♀		Pretoria	*Macrotermes vitrialatus*
	T440	1 ♂		Kendall	*Odontotermes badius*

Remarks

Vandel (1959) states that the difference between the genera *Trichorina* and *Niambia* is extremely 'delicate', in fact, hinges on the presence or absence of a frontal line. The present species is placed in *Niambia* as a frontal line is apparent. If Barnard's (1932) key to the species of *Niambia* is applied, it will be seen that the present species falls into the subgenus *Niambia* (having simple spines on the outer lobe of the first maxilla), and into the group having the fourth antennal segment distinctly longer than the third, and the outer ramus of the first pleopod cordiform. In this group, only *N. angusta* has this outer ramus without a projection on its outer margin as in the present species. *N. termitophila* differs from *N. angusta* in several respects, viz. in having eyes with fewer ocelli, in being a relatively narrower animal, and in being recorded from termite nests. The only other South African species of *Niambia*, recorded from a similar habitat, *N. formicarum*, taken from ant nests, differs sharply in possessing a projection on the outer margin of the outer ramus of the first pleopod. *N. eburnea* (Vandel) from the ant nests of the Ivory Coast is very similar to the present species, but is slightly smaller (male and female 3 mm in length), lacks any pigmentation, and has 5–6 ocelli per eye. The frontal line of this species is so obscure that Vandel (1952*b*) originally placed it in *Trichorina*. This would suggest that the existence of two such closely related genera is artificial.

DISCUSSION

Of the oniscoid isopods, one family of the tribe Crinocheta (Squamiferidae) and two families of the tribe Synochaeta (Titaniidae and Schoebliidae) have termitophilous representatives in southern Africa.

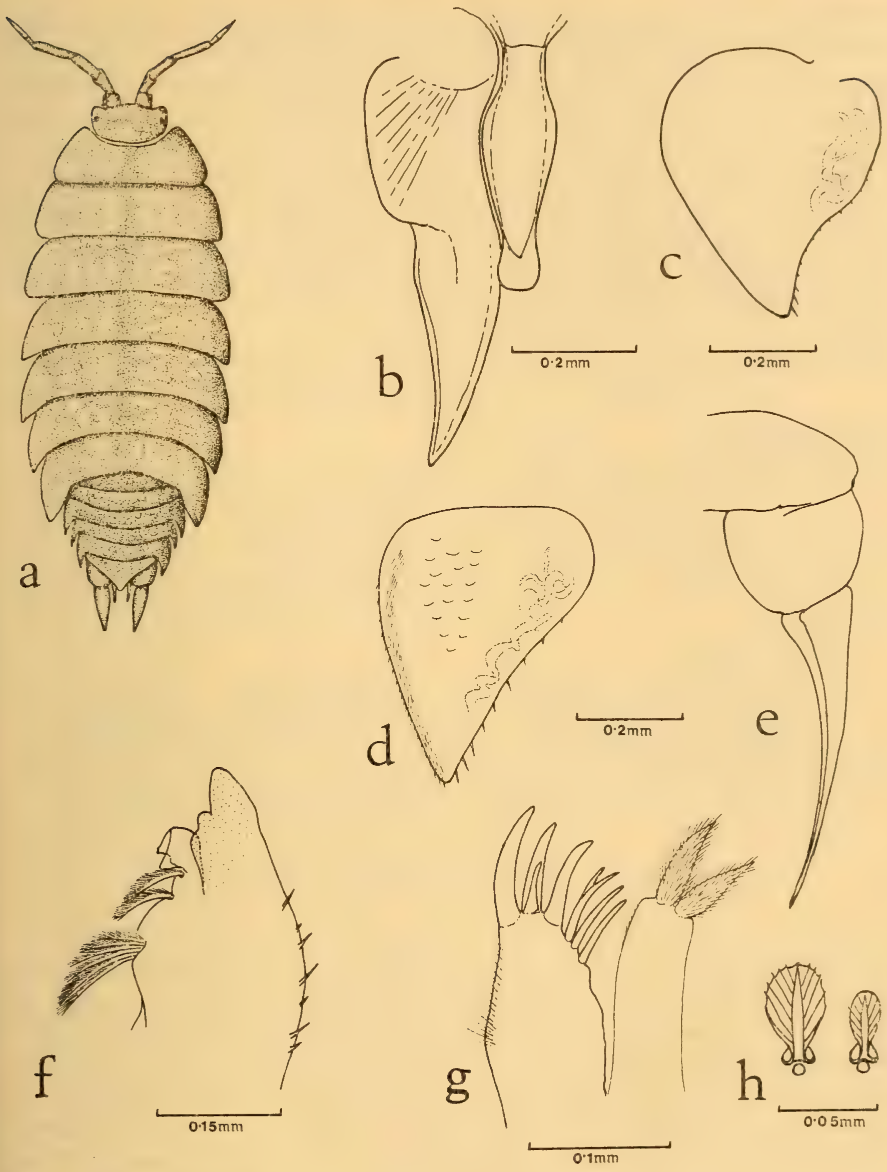

Fig. 7. *Niambia termitophila*

- *a.* Holotype in dorsal view.
- *b.* Genital apophysis and inner ramus of first pleopod, male.
- *c.* Outer ramus of first pleopod, male.
- *d.* Outer ramus of second pleopod, male.
- *e.* Inner ramus of second pleopod, male.
- *f.* Right mandible.
- *g.* First maxilla.
- *h.* Integumental scales.

These Crustacea, unlike many insects which occupy a similar habitat, cannot be regarded as true termitophiles as they do not fulfil two important prerequisites. They are not species specific (see Krishna, 1969: 11) nor do they live in close association with the termites as do many of the termitophilous insects. Nevertheless, it is more than likely that these forms do have an obligatory relationship with the termites, in that they are not found outside of the termite nest. They are most probably scavengers feeding on detritus contained in the nest system of their hosts. The Titaniidae are either tolerated by the termites or protected against attack by their flattened limuloid body shape plus the rapidity of their evasive movements.

Termite hosts	Termitophilous Isopoda	Recorded from
Hodotermitidae		
Hodotermitinae		
Hodotermes mossambicus (Hagen)	*Phylloniscus contractus*	S.W.A.
	Phylloniscus braunsi	R.S.A., S.W.A.
Microhodotermes viator (Latreille)	*Phylloniscus braunsi*	R.S.A., S.W.A.
	Titana mirabilis	R.S.A.
	Coatonia phylloniscoides	R.S.A.
	Antidorcasia elongata	R.S.A.
Termitidae		
Macrotermitinae		
Macrotermes subhyalinus (Rambur)	*Phylloniscus braunsi*	S.W.A.
Macrotermes vitrialatus (Sjöstedt)	*Niambia termitophila*	R.S.A.
Odontotermes badius (Haviland)	*Niambia termitophila*	R.S.A.
Odontotermes transvaalensis (Sjöstedt)	*Niambia termitophila*	R.S.A.
Nasutitermitinae		
Trinervitermes trinervoides (Sjöstedt)	*Phylloniscus braunsi*	R.S.A.
	Niambia termitophila	R.S.A.

TABLE 1. Termite hosts and associated Isopoda
R.S.A.: Republic of South Africa S.W.A.: South West Africa

Known hosts include the families Hodotermitidae and Termitidae. Since the nests of *Hodotermes mossambicus* are entirely hidden in the soil and not easily found, none have yet been searched for termitophiles; specimens of *Phylloniscus* were taken from the surface soil dumps of this host species at three localities and from its superficial foraging cells under a stone at another. The nests of *Microhodotermes viator* are frequently subtended on the surface by conical clay mounds in the karroid areas of South Africa, and several of these have been exposed and searched for termitophiles. Specimens of *Coatonia*, *Antidorcasia* and *Titana* were taken exclusively from the nests of this host species, those of *Phylloniscus* being collected as readily from its superficial foraging cells under stones as from its nests. All specimens of *Phylloniscus* associated with Termitidae were taken in the nests of the hosts. Other styloniscoid termitophiles which have been recorded from southern Africa, but are not represented in this collection, include *Kogmania depressa* Barnard, *Schoeblia circularis* Budde-Lund and *S. fulleri*

(Silvestri). With the exception of a single specimen taken from the nest mound of *Trinervitermes trinervoides*, all specimens of the squamiferid *Niambia termitophila* were collected from fungus chambers of the nests of Macrotermitinae.

SUMMARY

Two new genera of termitophilous isopods, *Coatonia* and *Antidorcasia*, each containing a single species, and a new species of *Phylloniscus*, are described. All these species, and also the previously described species of *Titana* and *Phylloniscus* belong to the family Titaniidae. A new species of the squamiferid isopod *Niambia*, also taken from termite nests, is described. Seven termite species from South Africa and South West Africa are involved as hosts to these curious crustaceans.

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BRIAN KENSLEY

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AMPHIPODA FROM SOUTHERN ANGOLA

By

Brian Kensley

South African Museum, Cape Town

(With 5 figures)

[*MS. accepted* 9 *December* 1970]

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Introduction

In September 1969 a joint expedition of the South African Museum, Cape Town, and the State Museum, Windhoek, visited Moçâmedes (15°10'S., 12°10'E), in southern Angola. The aim of the visit was to do preliminary surveys of the fauna of the rocky shores. It was hoped that this survey would help to give a more balanced view of the transitional area northern South West Africa/southern Angola, reported on by Penrith & Kensley (1970 *a*, *b*). As the amphipods collected at Moçâmedes proved to be rather different from those collected in South West Africa and included a new species, it was felt that a short report on this group was warranted.

List of Species Collected at Moçâmedes

Species	Distribution
Ampithoe pollex Kunkel	Oregon, U.S.A., Bermuda
Elasmopus affinis Della Valle	Congo, northern South West Africa
Elasmopus rapax Costa	Cosmopolitan tropical and temperate intertidal
Hyale media (Dana)	Cosmopolitan tropical intertidal
Jassa falcata (Montagu)	Cosmopolitan intertidal
Maera inaequipes (Costa)	Mediterranean, Canaries, S. Atlantic, S. Pacific, W. Africa
Pleonexes macrocornutus n. sp.	Moçâmedes, Angola
Stenothoe gallensis Walker	Caribbean, Mediterranean, Ceylon, Gambia, Hawaii

SYSTEMATIC DISCUSSION

Family **Ampithoidae**

Ampithoe pollex Kunkel

Fig. 1

Ampithoe pollex Kunkel, 1910: 92. Barnard, 1954: 29.

Description: Antenna 1 slightly longer than antenna 2. Mandibular palp 3-jointed, second article slightly longer than third. Gnathopod 1 male with dactyl serrated on inner edge, palm defined by stout spine, hind margin slightly longer than palm, second article with rounded distal lobe. Gnathopod 2 male, palm deeply incised to form strong acute 'thumb'. Latter closely applied to palm in juveniles, more widely spaced in adults, dactyl serrate on inner margin. Pereiopods 1 to 5, with sixth article bearing three to four spines, dactyl strongly curved. Uropod 1 with rami shorter than peduncle, outer ramus with two spines and three apical spines, inner ramus with three apical spines only. Second uropod with rami almost equal to peduncle in length, spination similar to first uropod with rami almost equal to peduncle in length, spination similar to first uropod. Uropod 3 with rami shorter than peduncle, inner ramus with two stout apical curved spines, outer ramus with three terminal spines. Telson triangular.

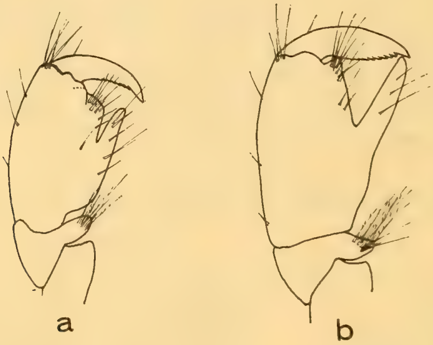

Fig. 1 a. *Ampithoe pollex.*
a. Second gnathopod, male 2·8 mm in length. b. Second gnathopod, male 3·8 mm in length.

Distribution: Oregon, U.S.A.; Bermuda.

Remarks: Except for slight differences in setation and spination, the present material agrees well with Barnard's figures of material from Oregon. The species was very common amongst the intertidal algae, and this represents a truly remarkable extension of the known distribution.

Pleonexes macrocornutus n. sp.

Figs 2, 3

Description: Male—antenna 1 reaching just beyond end of peduncle of second antenna. First and second peduncle articles subequal in length, first more robust, third article one fifth length of second. Antenna 2 very stout, first article half length of second, third slightly shorter than second. Mandibular incisor process with seven teeth, molar process weak, palp with first article one third length of second, third shorter than second, with numerous apical setae. Lower lip with outer lobe notched, setose. First maxilla with palp biarticulate, second

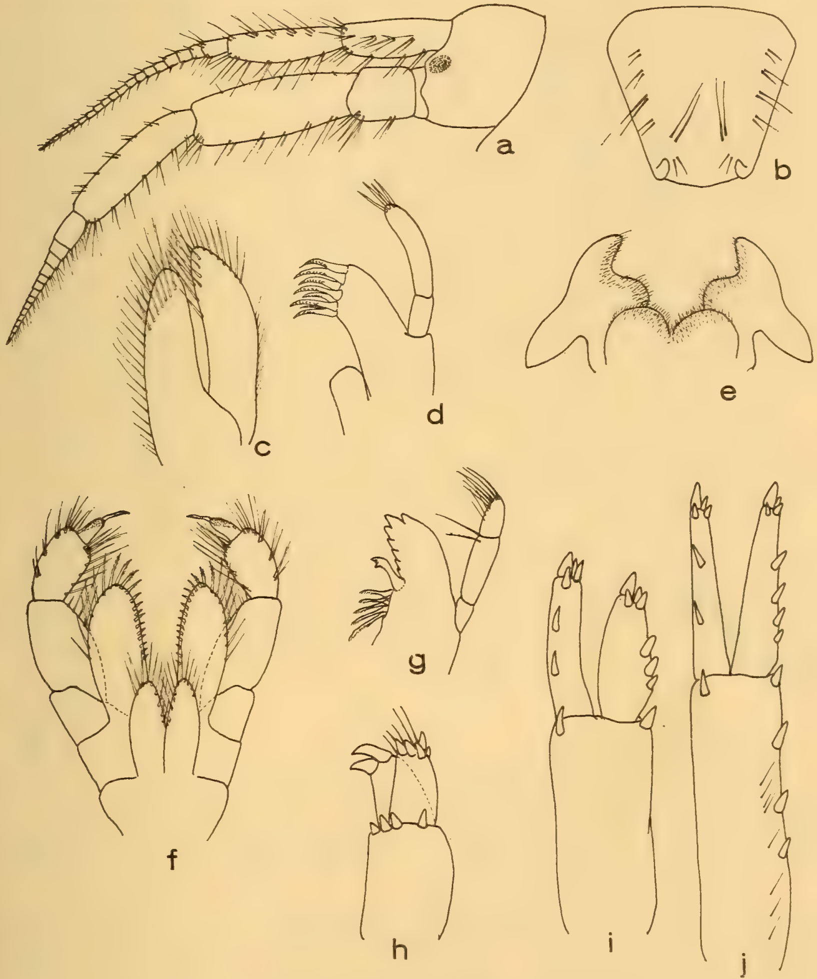

Fig. 2 *Pleonexes macrocornutus*

a. Head and antennae in lateral view. b. Telson. c. Second maxilla. d. First maxilla. e. Lower lip. f. Maxilliped. g. Mandible. h. Third uropod. i. Second uropod. j. First uropod.

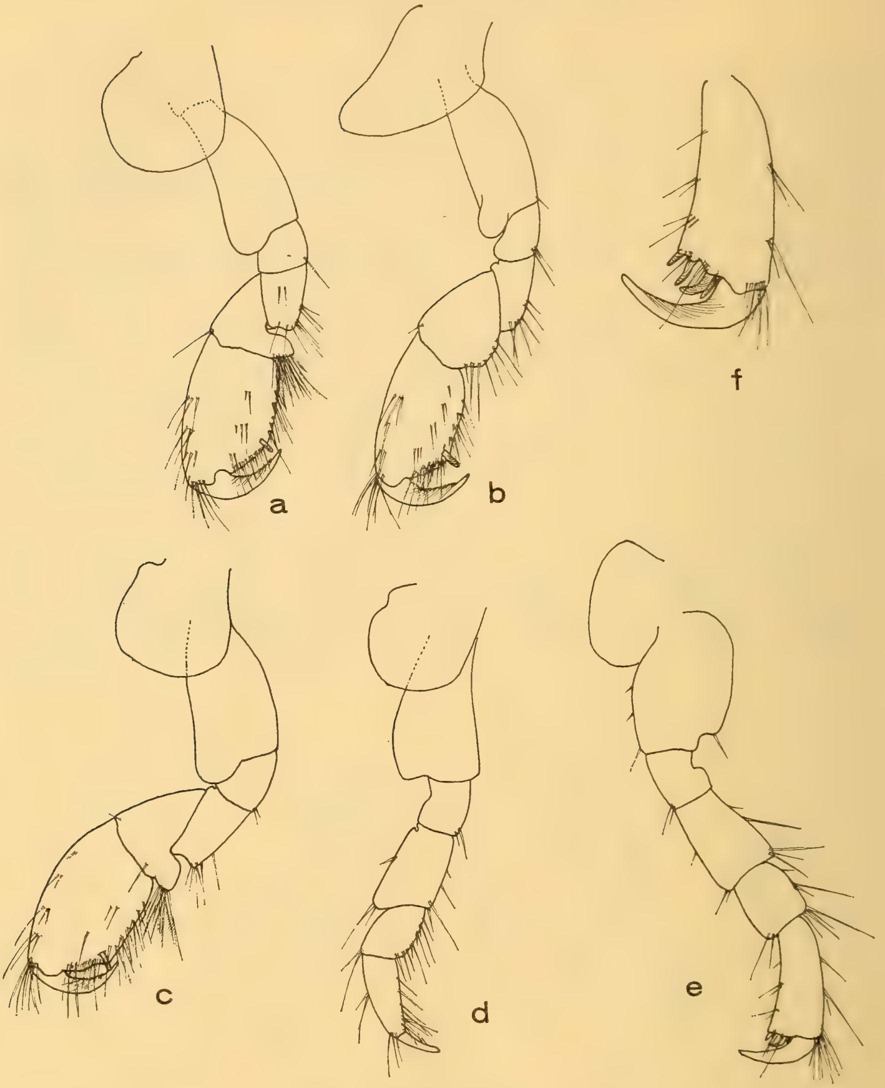

Fig. 3 *Pleonexes macrocornutus*

a. Second gnathopod, female. b. First gnathopod, male. c. Second gnathopod, male. d. First pereiopod. e. Fifth pereiopod. f. Propodus and dactylus, fifth pereiopod.

article three times length of first, bearing four apical setae. Outer plate well developed, bearing about ten dentate spines. Second maxilla plates equal in width, fringed with plumose setae. Maxilliped inner plate conical apically rounded, fringed with plumose setae. Outer plate reaching to end of second article of palp, inner margin with ten spines, becoming gradually longer distally, giving way to stout plumed setae. Second and third articles of palp fringed with long setae. Fourth article one third length of third, covered with minute bristles, armed with strong dentate spine. Gnathopods subequal in size, first gnathopod with sideplate somewhat anteriorly produced. Second article with distal rounded lobe, fifth and sixth articles with numerous setae, sixth article with palm shorter than hind margin, defined by stout spine, inner margin of dactyl serrate. Second gnathopod with rounded sideplate, lobe of fifth article bearing tuft of serrate setae. Sixth article, palm of two regions, that nearest hinge convex, rest of palm concave, defined by stout striate spine. Hind margin longer than palm. Dactyl overlapping palm, serrate on inner margin. First pereiopod with rounded sideplate, second article equal in length to third, fourth and fifth articles together. Fifth article shorter than sixth. Fifth pereiopod with second article equal in length to third plus fourth article. Sixth article distally expanded, bearing three straight and one curved stout striate spines. Dactyl also striate. First uropod rami slightly less than half length of peduncle, latter with distal row of four spines. Rami of equal length, outer broader than inner, with row of four short spines and four apical spines. Inner ramus with row of two short spines, four apical spines. Second uropod with outer ramus half length of peduncle, inner ramus slightly longer. Peduncle with two distal spines. Outer ramus with row of three spines, four apical spines. More slender inner ramus with row of two spines, four apical spines. Third uropod with rami two thirds length of peduncle, latter with four short distal spines. Outer ramus equal in length to inner, with two strong uncinate apical spines. Inner ramus with five short apical spines, four slender setae. Telson bluntly triangular, with two distal blunt hooks, numerous setae.

Female—first antenna with peduncle relatively longer than in male, second peduncle article reaching two thirds of length of second peduncle article of second antenna. Second antenna similar to male.

Gnathopod 1 sideplate slightly produced anteriorly, palm evenly convex, defined by stout striate spine, shorter than hind margin. Dactyl serrate on inner margin. Second gnathopod, lobe on fifth article with tuft of serrate setae, sixth and seventh articles similar to those of gnathopod one.

Type Material:

	Institution	Length in mm (excluding antennae)
Holotype	South African Museum S.A.M. A12837	male 6·8
Paratypes	South African Museum S.A.M. A12838	4 males, 6·0–6·8 4 ovigerous females, 8·0–9·0 4 juveniles
Paratypes	State Museum, Windhoek	
	N. 50004	2 males, 4·9, 6·1
	N. 50005	2 ovigerous females, 7·5, 9·0
Paratypes	Lisbon	2 males, 5·2, 6·0 2 ovigerous females, 8·0, 8·0

Remarks: The presence of a mandibular palp, the lack of an accessory flagellum, a telson bearing recurved cornified processes and the pereiopods three to five having the sixth segment distally expanded, places this species in the genus *Pleonexes.*

The shape of the second gnathopod of the male immediately separates this species from *P. gammaroides* (from the Mediterranean, the Atlantic coast of Europe, North Africa, the Canaries and the Azores) and from *P. ferox* (from the Mediterranean and the Canaries). *P. lessoniae* from New Zealand has a similar gnathopod structure to the present species, but differs in the structure of the antennae, the maxillipeds, the uropods, telson and especially the lower lip. The species referred to by Barnard (1966) as *Pleonexes*(?) species, also differs in the second gnathopod structure of the male, and in the telson which lacks cornified processes. As the present specimens can thus not be reconciled to any of the described species, a new species must be erected for it.

Family **Gammaridae**

Elasmopus rapax Costa

Fig. 4

Elasmopus rapax: Barnard, 1955: 10; 1966: 503.

Distribution: Cosmopolitan tropical and temperate intertidal.

Remarks: As noted by Barnard (1955) this species is very variable, especially with regard to the second gnathopods of the male. The present material resembles the male figured by Barnard (1966) from Micronesia. However, the lack of long setae on the second article of the pereiopods 3 to 5, and the uniarticulate accessory flagellum seem to place the material in the subspecies *mutatus* Barnard, recorded from southern California. The present material was collected along with specimens of *E. affinis* from amongst algae on the rocky shore at the lowest region exposed by the low tide of spring.

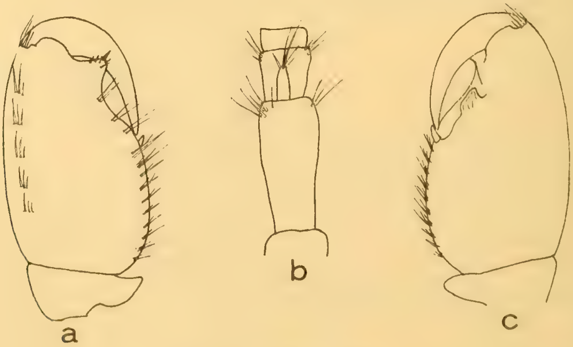

Fig. 4 *Elasmopus rapax*

a. Second gnathopod, male, outer view. b. Accessory flagellum. c. Second gnathopod, male, inner view.

Family **Hyalidae**

Hyale media (Dana)

Fig. 5

Hyale media: Ruffo, 1950: 60. Stephenson, 1947: 37. Barnard, 1966: 520.

Distribution: Pantropical.

Remarks: The present material agrees well with Stephenson's description, with a few slight differences. Gnathopod 2 of the male does not have the spines defining the separation of the palm and the hind margin as well developed as the Tristan specimens, but agrees more closely with Ruffo's figure of the Venezuelan specimens. The third pair of uropods have a relatively more slender peduncle, and the uropodal spination agrees with the Venezuelan rather than with the Tristan specimens.

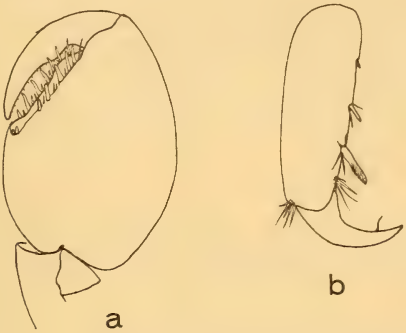

Fig. 5 *Hyale media*
a. Second gnathopod, male. b. Propodus and dactylus, fifth pereiopod.

It is interesting to note that while *H. media* is common at Moçâmedes, about 200 kilometres away, at the rocks just north of the Kunene River mouth, *H. saldanha* is very common, and *H. media* does not appear.

SUMMARY

A collection of eight species of gammarid amphipods from southern Angola is discussed. Four of the species are widely distributed through tropical regions. One species, *Ampithoe pollex*, has not previously been recorded from the African coast, while the species of *Pleonexes* proved to be previously undescribed.

ACKNOWLEDGEMENTS

My sincere thanks are due to the Governor-General of the province of Angola, the Governor of the district of Moçâmedes, and to the Instituto de Investigação Científica de Angola, for granting permission to work and collect in Angola. Grateful thanks are also due to the South African Council for

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K. G. McKenzie

British Museum (Natural History), London

[*MS. accepted* 12 *January* 1971]

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Introduction

In 1862 William Baird published the first description of a South African freshwater ostracode and in 1896 Georg Ossian Sars published the first descriptions of South African Ostracoda raised from dried mud cultures. Including these papers, a total of twenty-seven publications by twenty-one authors has resulted in the records of about 135 species (including subspecies) to date, the majority of these coming from the Cape Province.

The Ostracoda of South Africa exhibit a high degree of endemism at the species and genus levels and are characterized by the occurrence of many large species (defined here as those with a length reaching or exceeding 3 mm) and also by a great diversity of relatively small species in the subfamily Cypridopsinae. It is certain that many new species remain to be described, but here reference is made only to a few new records for the South African fauna.

One of these is the first local record of the family Darwinulidae, genus *Darwinula*, a taxon which elsewhere is common in land aquatic environments. The South African representative was identified in material collected by the Department of Zoology, Rhodes University, Grahamstown, at Lakes Sibaya and Nhlanga, northern Zululand. Also collected from these lakes was an undescribed species in the genus *Loxoconcha*, a species in the genus *Perissocytheridea*, and a paracypridine species, plus five other cypridids.

At Swartkops Estuary, near Port Elizabeth, I collected a sample which contained some juvenile valves of the genus *Cyprideis*, an index for polyhaline conditions.

Collections made by R. G. Noble from the Provincial Lowveld Fisheries Station, Marble Hall, Transvaal, include interesting new records of the genera *Stenocypris*, *Hemicypris* and *Cypris* (*cf.* Taxonomic Notes).

Ann. S. Afr. Mus. **57** (9), 1971: 157–213

Two new cypridopsine taxa were collected by me on Table Mountain. This is the first published record of Ostracoda on the mountain, as far as I am aware, although ostracodes apparently have been cultured successfully by students at the University of Cape Town, from dried muds collected there (J. Heeg, Department of Zoology, University of Natal; personal communication 4 October 1970).

The spirit collections of the South African Museum, which are the best extant collections of South African freshwater Ostracoda, formed the basis for the taxonomic revisions made here. These comprise an objective synonymy, several subjective synonymies, an objective homonymy and a possible subjective homonymy as well as numerous reassignments at the generic level. Two new tribes are proposed.

The generally good condition of the South African Museum material owes much to work done earlier (in 1963) by D. H. Eccles, Fisheries Research Officer, Monkey Bay, Malawi, as the Appendix makes clear.

No attempt was made to determine unidentified material beyond the generic level. Such collections are listed separately in the Appendix. The Appendix was intended to be complete, but large collections remain to be identified at the National Institute for Water Research, Pretoria; and other unidentified collections are on loan to Dr H. W. Schäfer.

In the Appendix, the initials against some species determinations refer to the following workers: Baird (W. B.); Brady (G. S. B.); Daday (E. V. D.); Eccles (D. H. E.); Fox (H. M. F.); Harding (J. P. H.); Hartmann (G. H.); Klie (W. K.); McKenzie (K. G. M.); Müller (G. W. M.); Rome (R. R.); Sars (G. O. S.). The generic placements of these species are my responsibility.

Many new field collections were made and it is my hope to report on these later.

Taxonomic Notes

The aim has been to make this species list as objective a record as possible of the present state of knowledge after work with the South African Museum and some other collections.

Synonymies are kept at a minimum to retain this objectivity. For example, *Physocypria capensis* (Sars) 1896 and *Physocypria armata* (Müller) 1898 may well be synonymous, as Sars (1924*a*) suggested. But, in view of the records of *armata* from South Africa by Brady (1907) and Müller (1914) I have not felt justified in supporting Sars without the opportunity for comparing the two type materials.

I have altered records of several species which were first described outside South Africa by interpolating cf. to indicate doubt as to their identity with South African forms, e.g. '*Cypridopsis*' cf. *aculeata* (Costa) 1847, originally described from near Naples.

I use sp. aff. to indicate taxa which, in my opinion, are possibly new but which nevertheless bear comparison with the species indicated, e.g. *Perissocytheridea* sp. aff. *estuaria* Benson & Maddocks 1964 for a taxon from Lake Sibaya.

The generic reassessments are indeed subjective. In all such cases, previous genus names are included in the synonymy below my generic determination together with the relevant authors' names and dates.

The notes which follow are intended to clarify points of taxonomic interest.

1. ? *Cyclocypris pusilla* Sars 1896. Sars (1924*a*: 177) notes that the original material has been lost. Müller (1912: 127) records *pusilla* under *Cyclocypris* as a doubtful assignment. Until the taxon has been re-collected it will not be possible to decide concerning the generic status (but see Appendix One, H).
2. *Cypridopsis* and *Pionocypris*. The best discussion is in Howe (1962: 61). As the generic synonymy is objective, because the same species was designated as type for both genera, this means that many South African species determined as *Cypridopsis*, especially by Sars who used *Pionocypris* for taxa in *Cypridopsis* s.s., are left without a satisfactory generic name. My *pro tem* solution has been to list these as '*Cypridopsis*', using the inverted commas to indicate their difference from species of *Cypridopsis* s.s.
3. Cypridopsine new genus. Some of the characters which separate this taxon from other cypridopsines are given in the generic key (in preparation). The informal designation is the only way at present by which the interesting Table Mountain records can be included in the species list.
4. '*Cypridopsis*' *tumidula* (Sars) 1924*a* is a junior objective homonym of *Cypridopsis tumidula* Sars 1910.
5. *Plesiocypridopsis* and '*Cypridopsis*'. Rome (1965) comments on the fact that on the first thoracic limbs of *Plesiocypridopsis* species the male left palp is larger than the male right palp, a reversal of the typical case in European '*Cypridopsis*' species, and uses this reversal as one of the characters which separate *Plesiocypridopsis* from other cypridopsines. All '*Cypridopsis*' species for which bisexual populations were available in the South African Museum material, however, show the same reversal. This particular character, therefore, cannot be used to separate *Plesiocypridopsis* from '*Cypridopsis*' in South Africa, although on other grounds the two categories remain distinct.
6. The genus *Cyprilla* has been synonymized with *Potamocypris*, but I see no reason to abandon Sars's name. The generic characters given in Sars (1924*a*) are sufficient to establish the distinctiveness of *Cyprilla.*
7. The descriptions and illustrations of *Cyprilla mastigophora* (Methuen) 1910 and *C. producta* Sars 1924*a* indicate that these taxa are identical. *C. reniformis* (Brady) 1907 may prove to be their senior synonym, but the available description and illustration is inadequate to decide this and the size of *reniformis* is less than that recorded for both *mastigophora* and *producta.*
8. The presence in cyprettines of normal, if very slender, furcae and the occurrence in them of radial septa are used to set up Cyprettinae as a subfamily distinct from Cypridopsinae.
9. Bradycyprini is established within Cyprettinae as a new tribe which also is characterized by a slender furca—but not as slender as in Cyprettini—

and by the presence of radial septa in the right valve only. As the species list indicates, Bradycyprini incorporates the genera *Bradycypris* Sars 1924*a* and *Paracypretta* Sars 1924*a*.

10. *Homocypris oblonga* (Sars) 1924*b*. The material determined by Sars as *Heterocypris oblonga* in the South African Museum collection clearly belongs in *Homocypris*. Rome (1965) has noted the similarity between *Homocypris* and cyprinotine species. Eccles refers the specimens to *Homocypris conoidea*, but *H. oblonga* differs from *H. conoidea* at least in that the natatory setae of the antenna are long in *oblonga*, reaching the tips of the terminal claws, but markedly shorter in *conoidea*. Sars's illustrations of the two species make this clear and the South African Museum collection confirms that his drawings are exact in this respect.
11. Cypricercini is established as a new tribe within Cypridinae on the grounds of: general shape of the valves, a flexuous furcal ramus and the presence of a loculus at the proximal branching of the chitin support. *Tanycypris* Triebel is placed tentatively within Cypricercini because it has the two latter characters while differing somewhat in general shape. *Gesa* Hartmann was based on an immature female and its chitin support was neither described nor illustrated (Hartmann 1957). Since *Gesa* closely resembles *Tanycypris* in general shape and in many 'soft part' characters apart from the furca, it may turn out to be a senior synonym of *Tanycypris* when the adult form is known.
12. *Cypris* s.s. is distinguished at least by an undivided penultimate segment on the walking leg (second thoracic limb) from *Eucypris* s.s. in which this segment is clearly divided. No South African species originally referred to *Cypris* in fact belong there. Some South African Museum specimens determined by Eccles as *Cypris latissima* Müller 1898 proved to be *Pseudocypris triquetra* Sars 1924*a*. I recently identified *Cypris* cf. *latissima* Müller 1898 in material collected by R. G. Noble from the Provincial Lowveld Fisheries Station, Marble Hall, Transvaal. Since *Cypris* apparently does not occur elsewhere in South Africa this record may represent an introduced species.
13. The genus *Hemicypris* is characterized by a right valve which overlaps the left valve, the latter being denticulate at least posteroventrally. In ? *Hemicypris inversus* (Daday) 1913 these characters are inverted in the different sexes, hence the specific name and the tentative determination. A definite *Hemicypris* occurs in Noble's collections from the Provincial Lowveld Fisheries Station. This latter species may also qualify as an introduced exotic.
14. *Candonocypris candonoides* (King) 1855. The species was recorded by Sars (1896) as occurring in one of his South African aquaria, but he later (1924*a*: 177) decided that it was probably a contaminant and that the taxon was endemic to Australasia. In my opinion, the larval stages recorded as *Candonocypris* sp. by Müller (1908) probably were larval stages of *Afrocypris* Sars.

15. *Afrocypris* is placed tentatively in Dolerocypridini because of its similarities to *Candonocypris* in: general carapace shape, the prominent secondary fused zone in the right valve and the spatulate distal segment of the maxillule palp. The hemipenis, however, is distinctive as is the shell size.
16. *Apatelecypris brevis* (Sars) 1924*b* and *Apatelecypris schultzei* (Daday) 1913 may be synonymous as suggested by Eccles in his determinations of South African Museum collections. The reported size differences between the two species are such, however, that without comparing both type materials in detail I cannot decide regarding the synonymy. The record by Barnard (1935) of very large—up to 4 mm—specimens of *A. brevis* from N'kate Pan in the Kalahari would be worth rechecking as it may represent a new species in the genus.
17. *Sclerocypris tuberculata* (Methuen) 1910 and (Sars) 1924*a*. The Sars taxon resembles Methuen's species in so many details that it is most probably identical with it as well as being a junior subjective homonym. Klie's species, *biconica* is certainly synonymous with the Methuen form, as recorded in the list. *Sclerocypris* has a different shape in dorsal view from *Megalocypris* as Sars's illustrations make clear (Sars 1924*a*, *b*) apart from several differences in the soft anatomy.
18. The tentative referral of *Mesocypris* to the tribe Scottini is based on the morphology of its furca and follows Dr D. Danielopol, Speological Institute, 'E. Racovitza', Bucharest, Rumania (personal communication 10 February 1969).
19. *Stenocypris* s.s. is characterized by the presence of radial valve septa. All the South African species previously referred to *Stenocypris* belong either in *Chrissia* Hartmann or *Parastenocypris* Hartmann in which radial septa are absent. I identified *Stenocypris* s.s. in Noble's collections from the Provincial Lowveld Fisheries Station, Marble Hall, Transvaal, and in the absence of other records consider it to be an introduced exotic.
20. Concluding, it seems that such genera as *Cypris*, *Stenocypris* and *Cyprinotus*, which were recorded as part of the South African fauna in previous papers in fact do not occur apart from accidental introductions into such susceptible environments as fisheries stations and ricefields. This conclusion reinforces the known high degree of endemism in the South African fauna.

SPECIES LIST

Family : Darwinulidae
Genus : *Darwinula* Brady & Robertson 1885

Darwinula sp.
Localities : Lake Sibaya and Lake Nhlange in northern Zululand (*cf.* Introduction)
Length : ♀ = 0·6–0·7 mm

Family : Cytheridae
Subfamily : Limnocytherinae
Genus : *Gomphocythere* Sars 1924*a*
Synonymy : *Cytheridella* (of Müller 1914); *Limnicythere* (of Sars 1910)

Gomphocythere capensis (Müller) 1914
Locality : freshwater pond near Chapmans Bay (Müller 1914)
Length: : 0·6–0·66 mm (Müller 1914)

Gomphocythere expansa Sars 1924*a*
Locality : pond on the Cape Flats (Sars 1924*a*)
Length : ♂ = 0·69 mm, ♀ = 0·77 mm (Sars 1924*a*)

Gomphocythere obtusata (Sars) 1910
Localities : Victoria Nyanza (Sars 1910); freshwater pond near Chapmans Bay (Müller 1914); small duck pond at Salt River, near Cape Town; small pools near the whaling station at Saldanha Bay (Sars 1924*a*)
Length : ♂ = 0·70 mm, ♀ = 0·80 mm (Sars 1924*a*)

Genus : *Limnocythere* Brady 1868
Synonymy : *Limnicythere* (of various authors)

Limnocythere aethiopica Klie 1934
Locality : Banagher Pan, Lake Chrissie district, Transvaal (Klie 1934)
Length : ♂ = 0·65 mm, ♀ = 0·57 mm (Klie 1934)

Subfamily : Cytherideinae
Genus : *Cyprideis* Jones 1857

Cyprideis sp.
Locality : Swartkops Estuary, near Port Elizabeth (*cf.* Introduction)
Length : about 1 mm

Genus : *Perissocytheridae* Stephenson 1938

Perissocytheridae sp. aff. *estuaria* Benson & Maddocks 1964
Locality : Lake Sibaya, northern Zululand (*cf.* Introduction); Knysna Estuary (Benson & Maddocks 1964)
Length : about 0·6 mm

Subfamily : Loxoconchinae
Genus : *Loxoconcha* Sars 1866

Loxoconcha sp.
Locality : Lake Sibaya and Lake Nhlange, northern Zululand (*cf.* Introduction)
Length : about 0·4 mm

Family : Cyprididae
Subfamily : Ilyocypridinae
Genus : *Ilyocypris* Brady & Norman 1889

Ilyocypris australiensis Sars 1889
Locality : mud near Bergvliet (Sars 1924*a*)
Length : ♀ amounting to 0·82 mm (Sars 1924*a*)

Subfamily : Paracypridinae
Genus : *Paracypris* Sars 1866

? *Paracypris* sp. aff. *westfordensis* Benson & Maddocks 1964
Locality : Lake Nhlange, northern Zululand (*cf.* Introduction); Knysna Estuary (Benson & Maddocks 1964)
Length : about 0·8 mm

Subfamily : Candoninae
Genus : *Candonopsis* Vávra 1891

Candonopsis nama Daday 1913
Synonymy : *C. namaica* (on explanation to Plate 6 in Daday 1913)
Locality : Besondermaid, a watering-place between Berseba and Bethanie, Great Namaqualand (Daday 1913)
Length : ♂ and ♀ = 0·9 mm (Daday 1913)

Subfamily : Cyclocypridinae
Genus : *Cyclocypris* Brady & Norman 1889

? *Cyclocypris pusilla* Sars 1896
Locality : Knysna swamp (Sars 1896)
Length : ♀ = 0·48 mm (Sars 1896)

Genus : *Physocypria* Vávra 1896
Synonymy : *Cypria* (of Sars 1896, 1924*a*; Müller 1898; Brady 1904, 1907, 1913)

Physocypria cf. *armata* (Müller) 1898
Localities : Madagascar (Müller 1898); Pietermaritzburg (Brady 1907); Sandvlei near Lakeside; freshwater pond near Chapmans Bay (Müller 1914)

Length : ♂ = 0·6–0·62 mm, ♀ = 0·67–0·71 mm (Müller 1898); 1·2 mm (Brady 1907); ♂ = 0·75 mm, ♀ = 0·77–0·86 mm (Müller 1914)

Physocypria capensis (Sars) 1896

Localities : Knysna swamp (Sars 1896); mud from pools on Green Point Common, Cape Town; near whaling station, Saldanha Bay (Sars 1924*a*); Banagher Pan 2, Frischgewaagd Kuil; Goedeverwachting Pan, Rietfontein Pan 1, Weltevreden East Pan (Hutchinson *et al.* 1932)
Length : ♂ = 0·60 mm, ♀ = 0·78 mm (Sars 1896); ♂ rather smaller than ♀, ♀ = 0·75 mm (Sars 1924*a*)

? *Physocypria castanea* (Brady) 1904

Locality : Greytown, Natal (Brady 1904); drinking-water pool close to 'Rydal Mount', Witsieshoek, Orange Free State; near prison, Port St. Johns, Pondoland (Brady 1913)
Length : 0·65 mm (Brady 1904)

Subfamily : Cypridopsinae
Genus : *Cypridopsis* Brady 1868
Synonymy : *Pionocypris* (of Sars 1924*a*)

Cypridopsis assimilis Sars 1896

Localities : Knysna swamp (Sars 1896); vlei at Port Elizabeth; pools near the whaling station at Saldanha Bay (Sars 1924*a*)
Length : ♀ = 0·68 mm (Sars 1896); ♀ about 0·70 mm (Sars 1924*a*)

Cypridopsis intermedia (Sars) 1924*a*

Locality : Pools on the Bergvliet Flats (Sars 1924*a*)
Length : ♀ about 0·60 mm (Sars 1924*a*)

Cypridopsis viduella Sars 1896

Localities : Knysna swamp (Sars 1896); Steinkopf and Kamaggas, Little Namaqualand; Koanip River, near Chamis, Great Namaqualand; Riet-Tinkas, south of Swakop near Salem, Hereroland (Daday 1913)
Length : ♀ = 0·58 mm (Sars 1896); ♂ = 0·6 mm, ♀ = 0·8 mm (Daday 1913); ♀ amounting to 0·63 mm (Sars 1924*a*)

Genus : *Plesiocypridopsis* Rome 1965
Synonymy : *Cypris* partim (of Methuen 1910); *Cypridopsis* partim (of Sars 1924*b*); *Cypridopsis* (of Klie 1933); *Cypridopsis* partim (of Hartmann 1957)

Plesiocypridopsis cf. *aldabrae* (Müller) 1898
Synonymy : *Cypridopsis newtoni* Brady & Robertson 1870 (in determinations by D. H. Eccles of South African Museum material)
Locality : Otjituo in Damaraland (Sars 1924*b*)
Length : ♀ = 0·90 mm

Plesiocypridopsis chrissiensis (Methuen) 1910
Locality : Lake Chrissie, Transvaal (Methuen 1910)
Length : 0·73 mm (Methuen 1910)

Plesiocypridopsis inaequivalva (Klie) 1933
Localities : Lake Chrissie, Blouwater Pan 4 and 5, Banagher Pan 3, Eliazar Pan, Eilands Pan (Hutchinson *et al.* 1932; Klie 1933); Lake Chrissie, Transvaal (Hartmann 1957)
Length : ♂ = 0·79 mm, ♀ = 0·88 mm (Klie 1933); 0·78 mm (Hartmann 1957)

Plesiocypridopsis insidiosa Rome 1965
Locality : Sta. 326, Kaokoveld, Gauko—Otavi, South West Africa (Rome 1965)
Length : ♂ = 0·70 mm, ♀ = 0·74 mm (Rome 1965)

Genus : '*Cypridopsis*'
Synonymy : *Cypris* partim (of Costa 1847); *Potamocypris* (of Sars 1896); *Proteocypris* partim (of Brady 1907); *Cypridopsis* (of various authors, *cf.* Taxonomic Notes)
'*Cypridopsis*' cf. *aculeata* (Costa) 1847
Localities : Zeekoevlei, Plumstead, near Simonstown (Müller 1908); Langevlei, near Simonstown; Sandvlei, near Lakeside; freshwater pond at Chapmans Bay (Müller 1914); a small pool on the Cape Flats (Sars 1924*a*); Brakpan 1 (Hutchinson *et al.* 1932)
Length : ♀ = 0·65–0·75 mm (Müller 1908); ♀ amounting to 0·65 mm (Sars 1924*a*)

'*Cypridopsis*' *brevis* (Sars) 1924*a*
Locality : pond on the Bergvliet Flats (Sars 1924*a*)
Length : ♀ scarcely exceeding 0·50 mm (Sars 1924*a*)

'*Cypridopsis*' *clavata* (Sars) 1924*a*
Locality : dam at Touws River Station, Worcester Division (Sars 1924*a*)
Length : ♀ amounting to 0·78 mm (Sars 1924*a*)

'Cypridopsis' echinata (Müller) 1908
Localities : Fish Hoek (Müller 1908); near Cape Town; a vlei at Port Elizabeth (Sars 1924*a*)
Length : ♀ = 0·70 mm (Müller 1908); amounting to 0·72 mm (Sars 1924*a*, in which only the ♀ is described)

'Cypridopsis' elizabethae (Sars) 1924*a*
Locality : Near Port Elizabeth (Sars 1924*a*)
Length : ♂ and ♀ present, amounting to 0·70 mm (Sars 1924*a*)

'Cypridopsis' glabrata (Sars) 1924*a*
Locality : Small dried-up pools near the whaling station at Saldanha Bay (Sars 1924*a*)
Length : amounting to 0·87 mm, ♂ of somewhat smaller size than ♀ (Sars 1924*a*)

'Cypridopsis' globuloides (Brady) 1907
Locality : Richmond, Natal (Brady 1907)
Length : 0·43 mm (Brady 1907)

'Cypridopsis' gregaria (Sars) 1896
Localities : Knysna swamp (Sars 1896); near Bergvliet; near the whaling station at Saldanha Bay (Sars 1924*a*)
Length : ♀ = 0·70 mm (Sars 1896); ♀ amounting to 0·80 mm, ♂ smaller (Sars 1924*a*)

'Cypridopsis' hirsuta (Sars) 1924*a*
Locality : Ashton (Sars 1924*a*)
Length : ♀ amounting to 0·80 mm (Sars 1924*a*)

'Cypridopsis' katesae (Hartmann) 1957
Locality : Gibeon, Great Namaqualand (Hartmann 1957)
Length : ♀ = 0·62–0·65 mm (Hartmann 1957)

'Cypridopsis' ochracea (Sars) 1924*a*
Localities : Faure, on the Cape Flats, near Cape Town; near the whaling station at Saldanha Bay (Sars 1924*a*)
Length : ♂ as well as ♀ known, amounting to 0·78 mm (Sars 1924*a*)

'Cypridopsis' punctata (Sars) 1924*b*
Locality : Otjituo, in Damaraland (Sars 1924*b*)
Length : ♀ = 0·70 mm (Sars 1924*b*)

'Cypridopsis' punctillata (Brady) 1907
Locality : Pietermaritzburg (Brady 1907)
Length : 0·57 mm (Brady 1907)

'Cypridopsis' pyramidula (Sars) 1924*a*
Locality : Ashton (Sars 1924*a*)
Length : ♀ measuring 0·59 mm (Sars 1924*a*)

'Cypridopsis' pygmaea (Sars) 1924*a*
Locality : mud from the Cape Flats (Sars 1924*a*)
Length : ♀ scarcely exceeding 0·45 mm (Sars 1924*a*)

'Cypridopsis' reniformis (Sars) 1924*a*
Locality : Fish Hoek Station pond (Sars 1924*a*)
Length : ♀ amounting to 0·80 mm (Sars 1924*a*)

'Cypridopsis' spinifera (Sars) 1924*a*
Localities : Cape Flats; mud from different localities in the neighbourhood of Cape Town (Sars 1924*a*)
Length : specimens mostly ♀s, amounting to 0·80 mm (Sars 1924*a*)

'Cypridopsis' striolata (Sars) 1924*a*
Locality : pond on the Bergvliet Flats (Sars 1924*a*)
Length : ♀ measuring 0·54 mm (Sars 1924*a*)

'Cypridopsis' tonsa (Sars) 1924*a*
Locality : pond on Green Point Common, Cape Town (Sars 1924*a*)
Length : ♀ amounting to 0·78 mm (Sars 1924*a*)

'Cypridopsis' trigonella (Sars) 1924*a*
Locality : near Bergvliet (Sars 1924*a*)
Length : ♀ = 0·63 mm (Sars 1924*a*)

'Cypridopsis' triquetra (Müller) 1908
Locality : Zeekoevlei, Plumstead, near Simonstown (Müller 1908)
Length : ♀ = 0·08–0·85 mm (Müller)

'Cypridopsis' tumidula (Sars) 1924*a*
Locality : near Port Elizabeth (Sars 1924*a*)
Length : ♂ = 0·50, ♀ = 0·58 mm (Sars 1924*a*)

Genus : Cypridopsine n. gen.

Cypridopsine n. gen. spp. (2)
Locality : Table Mountain (*cf.* Introduction)

Length : about 0·5 mm

Genus : *Cyprilla* Sars 1924*a*
Synonymy : *Proteocypris* partim (of Brady 1907); *Cypris* partim (of Methuen 1910)

Cyprilla arcuata Sars 1924*a*
Localities : near Bergvliet; also in samples sent to Sars from the South African Museum (Sars 1924*a*)
Length : ♀ scarcely exceeding 0·48 mm (Sars 1924*a*)

Cyprilla deflexa Sars 1924*a*
Locality : near Port Elizabeth (Sars 1924*a*)
Length : ♂ = 0·56 mm, ♀ = 0·60 mm (Sars 1924*a*)

Cyprilla gibbula Sars 1924*a*
Locality in several: of Sars's aquaria (Sars 1924*a*); roadside ditch on the high plateau, west of Calvinia, about 46 km from Vanrhynsdorp (collected K. G. McKenzie and A. T. Tankard, 26 September 1970)
Length : ♂s and ♀s known, measuring 0·48 mm (Sars 1924*a*)

Cyprilla humilis Sars 1924*a*
Locality : dam at Faure on the Cape Flats (Sars 1924*a*)
Length : ♂s and ♀s known, measuring 0·58 mm (Sars 1924*a*)

Cyprilla mastigophora (Methuen) 1910
Synonymy : *Cyprilla producta* Sars 1924*a*
Localities : Lake Chrissie, Transvaal (Methuen 1910); Klipdam, near Kimberley (Sars 1924*a*); Kaotwe Pan, Kalahari Desert (Barnard 1935); Lake Chrissie, Transvaal (Hartmann 1957)
Length : ♂s and ♀s amounting to 0·60 mm (Sars 1924*a*); ♀ = 0·60 mm (Hartmann 1957)

Cyprilla reniformis (Brady) 1907
Locality : Somkele, NW of Mtubatuba, Zululand (Brady 1907)
Length : 0·5 mm (Brady 1907)

Genus : *Oncocypris* Müller 1898

Oncocypris cf. *voeltzkowi* Müller 1898
Localities : Richmond and Pietermaritzburg (Brady 1907); Frischgewaagd Kuil, Transvaal (Hutchinson *et al.* 1932)

Length : not given (Brady 1907)

Genus : *Zonocypris* Müller 1898

Zonocypris cordata Sars 1924*a*
Localities : different places near Cape Town (Sars 1924*a*)
Length : amounting to 0·56 mm (Sars 1924*a*)

Zonocypris tuberosa Müller 1908
Localities : Zeekoevlei, Plumstead, near Simonstown (Müller 1908); vlei at Lakeside; Langevlei, Cape Province (Müller 1914); old gravel-pits on the Bergvliet Estate (Sars 1924*a*)
Length : ♂ and ♀ = 0·7–0·8 mm (Müller 1908); amounting to 0·75 mm, ♂ of nearly same size as ♀ (Sars 1924*a*)

Subfamily : Cyprettinae
Tribe : Cyprettini
Genus : *Cypretta* Vávra 1895
Synonymy : *Cypris* partim (of King 1855); *Cypridopsis* partim (of Sars 1889, 1894)

Cypretta cf. *globulus* (Sars) 1889
Locality : pond at Bergvliet (Sars 1924*a*)
Length : scarcely exceeding 0·7 mm (Sars 1924*a*)

Cypretta cf. *minna* (King) 1855
Locality : near Bergvliet (Sars 1924*a*)
Length : amounting to 0·90 mm (Sars 1924*a*)

Cypretta cf. *sarsi* Brady 1901
Locality : Pietermaritzburg (Brady 1907)
Length : not given (Brady 1907)

Cypretta cf. *turgida* (Sars) 1895
Locality : vlei on the Cape Flats (Sars 1924*a*)
Length : amounting to 0·90 mm (Sars 1924*a*)

Tribe : Bradycyprini n. (*cf.* Taxonomic Notes)
Genus : *Bradycypris* Sars 1924
Synonymy : *Cypris* (of Brady 1907); *Cypris* partim (of Müller 1908)

Bradycypris intumescens (Brady) 1907
Localities : Somkele, NW of Mtubatuba, Zululand (Brady 1907); old gravel-pits, Bergvliet Flats; Ashton (Sars 1924*a*)

Length : 1·35 mm (Brady 1907); amounting to 1·50 mm, ♂s rare (Sars 1924*a*)

Bradycypris radiata (Müller) 1908

Locality : Zeekoevlei, Plumstead, near Simonstown (Müller 1908)
Length : ♀ = 1·4 mm (Müller 1908)

Genus : *Paracypretta* Sars 1924
Synonymy : *Cypris* partim (of Brady 1904); *Cypris* partim (of Müller 1908, 1914)

Paracypretta acanthifera Sars 1924*a*

Locality : near Cape Town (Sars 1924*a*)
Length : ♀ amounting to 1·10 mm (Sars 1924*a*)

Paracypretta ampullacea Sars 1924*a*

Locality : vlei on Green Point Common and another locality near by (Sars 1924*a*)
Length : ♀ about 1 mm (Sars 1924*a*)

Paracypretta aratra (Brady) 1904

Locality : near Greytown, Natal (Brady 1904)
Length : 1·0 mm (Brady 1904)

Paracypretta rubra Sars 1924*a*

Locality : shallow vlei on the Bergvliet Flats (Sars 1924*a*)
Length : ♀ amounting to 0·90 mm (Sars 1924*a*)

Paracypretta syngramma (Müller) 1908

Locality : Zeekoevlei, Plumstead, near Simonstown; Fish Hoek (Müller 1908)
Length : ♀ = 1·10–1·1 mm (Müller 1908)

Paracypretta syngramma (Müller) 1908 var. *minor* (Müller) 1914

Locality : freshwater pond between Fish Hoek and Chapmans Bay (Müller 1914)
Length : 0·95 mm (Müller 1914)

Subfamily : Cypridinae
Incertae Sedis
Genus : *Homocypris* Sars 1924*a*
Synonymy : *Herpetocypris* partim, typographical error for *Heterocypris* (of Sars 1924*b*)

Homocypris conoidea Sars 1924*a*

Locality : old dried-up pits on the Bergvliet Flats; mud taken at Port Elizabeth (Sars 1924*a*)

Length : ♀ = 1·35 mm (Sars 1924*a*)

Homocypris longirostrata Rome 1965

Locality : Sta. 76, Cape Flats, 1·6 km E of Zeekoevlei, Cape Province (Rome 1965)

Length : ♀ = 1·14 mm (Rome 1965)

Homocypris oblonga (Sars) 1924*b*

Locality : Otjituo in Damaraland (Sars 1924*b*)

Length : ♀ = 1·30 mm (Sars 1924*b*)

Genus : *Liocypris* Sars 1924*a*

Liocypris grandis Sars 1924*a*

Locality : Stompneus, Cape Province (Sars 1924*a*)

Length : ♀ = 4·40 mm (Sars 1924*a*)

Tribe : Cypricercini n. (*cf.* Taxonomic Notes)

Genus : *Cypricercus* Sars 1896

Cypricercus cuneatus Sars 1896

Localities : Knysna swamp (Sars 1896); mud taken near Bergvliet (Sars 1924*a*)

Length : ♂ = 1·55 mm, ♀ = 1·75 mm (Sars 1896); ♀ = 1·60 mm (Sars 1924*a*)

Cypricercus episphaena Müller 1908

Localities : Zeekoevlei, Plumstead, near Simonstown; Fish Hoek (Müller 1908); Green Point Common, Cape Town (Sars 1924*a*)

Length : ♀ = 1·5–1·6 mm (Müller 1908); ♀ = 1·60 mm (Sars 1924*a*)

Cypricercus maculatus Müller 1908

Localities : Zeekoevlei, Plumstead, near Simonstown (Müller 1908); pond on the Cape Flats (Sars 1924*a*)

Length : ♂ = 1·6 mm, ♀ = 1·7 mm (Müller 1908); ♂ = 1·50 mm (Sars 1924*a*)

Genus : *Tanycypris* Triebel 1959

Synonymy : *Cypris* partim (of Brady 1904); *Cypris* (of Brady 1913); *Dolerocypris* (of Klie 1933)

Tanycypris clavigera (Müller) 1898

Locality : Sta. 254, Hensleys Dam, Basutoland (Rome 1965)
Length : ♀ = 1·18 mm

Tanycypris inermis (Brady) 1904

Localities : near Greytown, Natal (Brady 1904); small clear pool formed by drippings of a spring 0·4 km below the rock with Bushman paintings, near 'Rydal Mount', Witsieshoek, Orange Free State (Brady 1913)
Length : 0·95 mm (Brady 1904)

Tanycypris obtusa (Klie) 1933

Locality : Weltevreden West Pan, near Lake Chrissie, Transvaal (Hutchinson *et al.* 1932; Klie 1933)
Length : ♀ = 1·3 mm

Genus : *Gesa* Hartmann 1957

Gesa dubia Hartmann 1957

Locality : Lake Chrissie, Transvaal (Hartmann 1957)
Length : 0·92 mm (♀ late larval stage)

Tribe : Cypridini
Genus : *Cypris* Müller 1776

Cypris cf. *latissima* Müller 1898

Locality : Provincial Lowveld Fisheries Station, Marble Hall, Transvaal (*cf.* Introduction)
Length : not measured

Tribe : Eucypridini
Genus : *Eucypris* Vávra 1891
Synonymy : *Cypris* partim (of Sars 1896; Müller 1908)

Eucypris capensis (Müller) 1908

Localities : a vlei at Plumstead (Müller 1908); freshwater pond between Fish Hoek and Chapmans Bay (Müller 1914); a pond on Green Point Common (Sars 1924*a*)
Length : ♀ = 1·8–1·95 mm, ♂ unknown (Müller 1908); ♀ amounting to 1·80 mm (Sars 1924*a*)

Eucypris corpulenta (Sars) 1896

Localities : Knysna swamp (Sars 1896); Zeekoevlei, Plumstead, near Simonstown (Müller 1908)

Length : ♀ = 2·10 mm (Sars 1896, 1924*a*); ♀ = 1·9–2 mm (Müller 1908)

Eucypris hirta Sars 1924*a*

Localities : Green Point Common; near Bergvliet (Sars 1924*a*)
Length : ♀ amounting to 1·90 mm (Sars 1924*a*)

Eucypris producta Sars 1924*a*

Locality : a vlei near Port Elizabeth (Sars 1924*a*)
Length : ♀ amounting to 2·40 mm (Sars 1924*a*)

Eucypris purcelli Sars 1924*a*

Locality : Ashton, Cape Province (Sars 1924*a*)
Length : ♀ scarcely exceeding 2·30 mm (Sars 1924*a*)

Eucypris trichota (Müller) 1908

Localities : Zeekoevlei, Plumstead, near Simonstown (Müller 1908); Green Point Common, Cape Town (Sars 1924*a*)
Length : ♀ = 3 mm, ♂ unknown (Müller 1908); ♀ attaining 3 mm (Sars 1924*a*)

Eucypris trigona (Sars) 1896

Locality : Knysna swamp (Sars 1896)
Length : ♀ = 1·75 mm (Sars 1896)

Genus : *Pseudocypris* Daday 1908
Synonymy : ? *Eurycypris* (of Müller 1908); *Cypris* partim (of Methuen 1910); *Eurycypris* (of Müller 1914); *Cypris* (of Eccles, determinations in South African Museum collections)

Pseudocypris acuta (Müller) 1914

Locality : freshwater pond between Fish Hoek and Chapmans Bay (Müller 1914)
Length : ♂ = 2·8–3·3 mm, ♀ unknown (Müller 1914)

Pseudocypris circularis (Sars 1924*b*)

Localities : Onambeke, Ovamboland (Sars 1924*b*); 1·60 km N of Tsotsoroga Pan and N'kate Pan, Kalahari Desert (Barnard 1935)
Length : ♀ = 2·40 mm, ♂ unknown (Sars 1924*b*)

Pseudocypris expansa Sars 1924*a*

Locality : Kimberley (Sars 1924*a*); Avenue Pan, Brakpan 2, Eliazar Pan, Rietfontein Pan, Weltevreden East Pan, Transvaal (Hutchinson *et al.* 1932)

Length : ♂ = 2·90 mm, ♀ unknown (Sars 1924*a*)

Pseudocypris gibbera Sars 1924*b*
Localities : Otjituo, Damaraland; Onambeke, Onolongo, Tamansu, Ukualuthi, Ukualonkathi, Eunda, all in Ovamboland (Sars 1924*b*); N'kate Pan, Kalahari Desert (Barnard 1935)
Length : ♀ = 2·2 mm (Sars 1924*b*)

Pseudocypris spinosa (Methuen) 1910
Locality : Lake Chrissie, Transvaal (Methuen 1910); Weltevreden West Pan, Transvaal (Hutchinson *et al.* 1932)
Length : 3·3 mm (Methuen 1910)

Pseudocypris testudo Sars 1924*a*
Localities : Green Point Common; pond on the Cape Flats (Sars 1924*a*)
Length : ♀ = 3·50 mm (Sars 1924*a*)

Pseudocypris triquetra Sars 1924*a*
Synonymy : *Cypris latissima* (Müller) 1898 (determination by Eccles in South African Museum collections)
Locality : Kimberley (Sars 1924*a*)
Length : ♀ = 2·60 mm (Sars 1924*a*)

Tribe : Cyprinotini
Genus : *Hemicypris* Sars 1903
Synonymy : *Cyprinotus* partim (of Daday 1913)

? *Hemicypris inversus* (Daday) 1913
Locality : Ku-Gudie, between Phitsane and Kooa, Kalahari (Daday 1913)
Length : ♂ = 1·2 mm, ♀ = 1·2–1·3 mm (Daday 1913)

Hemicypris sp.
Locality : Provincial Lowveld Fisheries Station, Marble Hall, Transvaal (*cf.* Introduction)
Length : not measured

Genus : *Heterocypris* Claus 1893
Synonymy : *Cypris* partim (of Sars 1896, Methuen 1910); *Cyprinotus* (of Müller, 1908, 1914, Rome 1965); *Cyprinotus* partim (of Daday 1913); *Herpetocypris* partim typographical error for *Heterocypris* (of Sars 1924*b*)

Heterocypris aurea (Sars) 1896

Localities : Knysna swamp (Sars 1896); Kamaggas, Little Namaqualand (Daday 1913)

Length : ♂ = 1·32 mm, ♀ 1·60 mm (Sars 1896); ♂ = 2·2 mm, ♀ = 2·5 mm (Daday 1913)

Heterocypris calvus (Rome) 1965

Locality : Sta. 49, Toeslaan, Cape Province; Sta. 235, Quthing, Basutoland (Rome 1965)

Length : ♀ = 1·23 mm (Rome 1965)

Heterocypris capensis (Müller) 1908

Localities : Zeekoevlei, Plumstead, near Simonstown; Fish Hoek (Müller 1908); old gravel-pits on the Bergvliet Flats; small dried-up ponds near the whaling station at Saldanha Bay; near Cape Town (Sars 1924*a*)

Length : ♀ = 1·45–1·55 mm (Müller 1908); ♂ = 1·20 mm, ♀ = 1·40 mm (Sars 1924*a*)

Heterocypris gunningi (Methuen) 1910

? Synonymy : *Heterocypris congener* Vávra 1897 (of Hutchinson *et al.* 1932, Hartmann 1957)

Locality : Lake Chrissie, Transvaal (Methuen 1910, Hutchinson *et al.* 1932, Hartmann 1957); Eilandspan, Eliazar Pan, Liefgekosen Pan, Leeuwkraal Pan (Hutchinson *et al.* 1932)

Length : 1·30 mm (Methuen 1910); 1·2–1·3 mm (Hartmann 1957)

Heterocypris cf. *incongruens* (Ramdohr) 1808

Locality : a small grassy vlei on the Cape Flats (Sars 1924*a*)

Length : ♀ = 1·45 mm (Sars 1924*a* notes that this species propagates parthenogenetically in his aquaria)

Heterocypris ovularis (Sars) 1924*b*

Localities : Ukualuthi and Ongka, in Ovamboland (Sars 1924*b*); Kaotwe Pan, also 3·2 km N of Tsotsorogo Pan, Kalahari Desert (Barnard 1935)

Length : ♀ = 1·80 mm (Sars 1924*b*)

Tribe : Dolerocypridini

Genus : *Candonocypris* Sars 1894

Candonocypris candonoides (King) 1855 (*cf.* Taxonomic Notes)

Locality : Cape of Good Hope (Sars 1896)

Length : not given

Candonocypris sp. (Müller 1908) (*cf.* Taxonomic Notes)
Localities : Zeekoevlei, Langevlei, Fish Hoek (Müller 1908)
Length : not given, only larval stages present (Müller 1908)

Genus : *Afrocypris* Sars 1924*b*

Afrocypris barnardi Sars 1924*b*
Localities : Ukualuthi and Tamansu, in Ovamboland (Sars 1924*b*)
Length : ♀ = 5·30 mm (Sars 1924*b*)

Tribe : Herpetocypridini
Genus : *Herpetocypris* Brady and Norman 1889
Synonymy : *Stenocypris* (of Sars 1896)

Herpetocypris cf. *chevreuxi* (Sars) 1896
Locality : vlei on the Cape Flats (Sars 1924*a*)
Length : ♀ amounting to 2·30 mm (Sars 1924*a*)

Tribe : Isocypridini
Genus : *Amphibolocypris* Rome 1965

Amphibolocypris exigua (Rome) 1965
Locality : Sta. 287, Kruger National Park, Leeu Pan, 24 km NE of Skukuza; Transvaal (Rome 1965)
Length : ♂ = 1·47 mm, ♀ = 1·65 mm (Rome 1965)

Genus : *Isocypris* Müller 1908
Synonymy : *Hyalocypris* Brady 1913

Isocypris africana (Brady) 1913
Locality : 1 524 m at Witsieshoek, Orange Free State (Brady 1913)
Length : about 1·4 mm (measurement based on Plate 33 in Brady 1913)

Isocypris nivea Sars 1924*a*
Localities : Green Point Common (Sars 1924*a*); Sta. 49, Toeslaan, about 48 km N of Kakamas, Cape Province (Rome 1965)
Length : amounting to 1·90 mm, ♂ of about same size as ♀ (Sars 1924*a*)

Isocypris perangusta Müller 1908
Localities : Zeekoevlei, Plumstead, near Simonstown (Müller 1908); pond on the Cape Flats (Sars 1924*a*); Sta. 67, Steenkamp Puts, 59·5 km NW of Upington (Rome 1965)
Length : ♀ = 1·15–1·2 mm (Müller 1908); ♀ = 1·10 mm (Sars 1924*a*)

Isocypris priomena Müller 1908

Localities : Zeekoevlei, Plumstead, near Simonstown (Müller 1908); Green Point Common, Cape Town; Klipdam near Kimberley (Sars 1924*a*)

Length : non-ovigerous ♀ = 1·5 mm (Müller 1908); ♂s and ♀s scarcely exceeding 1·50 mm (Sars 1924*a*)

Tribe : Megalocypridini

Genus : *Apatelecypris* Rome 1965

Synonymy : *Megalocypris* (of Sars 1924*b*); *Herpetocypris* (of Daday 1913)

Apatelecypris brevis (Sars) 1924*b*

Localities : Namutoni (Sars 1924*b*); N'kate Pan, Kalahari Desert (Barnard 1935); Sta. 323, Kaokoveld, Kowares, 145 km SE of Ohopoho, in rock pools, Sta. 339, Kaokoveld, Anabib (Orupembe), about 160 m W of Ohopoho; Sta. 340 Kaokoveld, Sanitatas, about 137 m WSW of Ohopoho (Rome 1965)

Length : ♀ = 2·90 mm, ♂ resembling the ♀ in size (Sars 1924*b*); up to 4 mm (Barnard 1935); ♂ = 2·50 mm, ♀ = 2·48 mm (Rome 1965)

Apatelecypris schultzei (Daday) 1913

Locality : Besondermaid, a watering-place between Berseba and Bethanie, Great Namaqualand (Daday 1913)

Length : ♂ = 1·6 mm, ♀ = 1·4–1·8 mm (Daday 1913)

Genus : *Megalocypris* Sars 1898

Synonymy : *Candona* (of Baird 1862)

Megalocypris durbani (Baird) 1862

Synonymy : *Megalocypris hodgsoni* Sars 1898

Localities : near Cape Town (Baird 1862); vlei near Port Elizabeth (Sars 1898); vlei near Cape Town (Sars 1924*a*); Sta. 339, Kaokoveld, Anabib (Opurembe), about 160 m W of Ohopoho, South West Africa (Rome 1965)

Length : amounting to 5·20 mm, ♂ of nearly the same size as the ♀ (Sars 1924*a*)

Megalocypris hispida Sars 1924*a*

Locality : a pond on the Cape Flats (Sars 1924*a*)

Length : ♀ = 5·10 mm, ♂ about same size (Sars 1924*a*)

Megalocypris princeps Sars 1898

Locality : pond on Green Point Common, Cape Town (Sars 1898);

freshwater ponds, between Fish Hoek and Chapmans Bay and between Zeekoevlei and Plumstead (Müller 1914); mud taken from about the same locality as that recorded in 1898 (Sars 1924*a*)

Length : ♂ = 6·5–7 mm, ♀ = 7·30 mm (Sars 1898); attaining 7·70 mm (Sars 1924*a*); Müller's record based on larval stages only (Müller 1914)

Genus : *Sclerocypris* Sars 1924*a*

Synonymy : *Cypris* partim (of Methuen 1910); *Megalocypris* partim (of Sars 1924*a*); *Megalocypris* (of Hutchinson *et al.* 1932); *Afrocypris* (of Klie 1933)

Sclerocypris clavularis Sars 1924*a*

Locality : vlei at Klipdam, near Kimberley (Sars 1924*a*)

Length : amounting to 2·80 mm, ♂s fully as large as ♀ (Sars 1924*a*)

Sclerocypris exserta Sars 1924*b*

Localities : Ondongua, Ukualuthi, Ukualonkathi, Eunda, Onolongo, Onambeke, Andoni, all in Ovamboland (Sars 1924*b*)

Length : ♀ = 2·90 mm, ♂ resembles ♀ in size (Sars 1924*b*)

Sclerocypris major Sars 1924*b*

Localities : Onolongo, Tamansu, Eunda, Ukualuthi, all in Ovamboland; Tsumeb in Damaraland (Sars 1924*b*)

Length : ♀ = 3·30 mm, ♂s slightly shorter than ♀s (based on Plates 22 and 23 in Sars 1924*b*)

Sclerocypris superba Sars 1924*b*

Locality : Andoni, Eunda, both in Ovamboland (Sars 1924*b*)

Length : ♀ amounting to 4 mm, ♂ resembling ♀ closely in size (Sars 1924*b*)

Sclerocypris tuberculata (Methuen) 1910

Synonymy : *Afrocypris biconica* Klie 1933

Localities : Lake Chrissie, Transvaal (Methuen 1910); Blouwater Pan 4, Lake Chrissie district, Transvaal (Hutchinson *et al.* 1932, Klie 1933)

Length : 2·9 mm (Methuen 1910, typographical error, in paper as 1·9 mm); 3 mm (Klie 1933)

Sclerocypris tuberculata (Sars) 1924*a*

Locality : Kimberley (Sars 1924*a*); Eliazar Pan (Hutchinson *et al.* 1932)

Length : ♀ = 3·60 mm (Sars 1924*a*)

Sclerocypris venusta (Vávra) 1897
Locality : Lake Chrissie, Transvaal (Methuen 1910)
Length : ? 3·6 mm (Vávra 1897; length not given in Methuen 1910)

Tribe : ? Scottini
Genus : *Mesocypris* Daday 1908

Mesocypris terrestris Harding 1953
Locality : Knysna forest (Harding 1953)
Length : 0·91 mm (Harding 1953)

Tribe : Stenocypridini
Genus : *Stenocypris* Sars 1889

Stenocypris sp.
Locality : Provincial Lowveld Fisheries Station, Marble Hall, Transvaal (*cf.* Introduction)
Length : not measured

Genus : *Chrissia* Hartmann 1957

Chrissia levetsovi Hartmann 1957
Locality : Lake Chrissie, Transvaal (Hartmann 1957)
Length : 1·7 mm (Hartmann 1957)

Genus : *Parastenocypris* Hartmann 1964
Synonymy: : *Stenocypris* (of Brady 1904, 1907, 1913; Müller 1908, 1914; Sars 1924*a*, *b*; Rome 1965)

Parastenocypris aldabrae (Müller) 1898
Localities : Pietermaritzburg (Brady 1907); pond by prison, Port St. Johns, Pondoland (Brady 1913)
Length : 2·3 mm? (in text of Brady 1907: 179, it is 23 mm)

Parastenocypris ametra minor (Müller) 1908
Locality : Fish Hoek (Müller 1908)
Length : ♂ = 2·1 mm (Müller 1908)

Parastenocypris ametra typica (Müller) 1908
Synonymy : *Stenocypris olivacea* Sars 1924*a*
Localities : vlei near Lakeside, Cape Flats (Müller 1908); Zeekoevlei, Plumstead, near Simonstown (Müller 1908); Sandvlei, near Lakeside (Müller 1914); Cape Flats, alongside railway line between Retreat and Lakeside (Sars 1924*a*);

Sta. 163, Cape Flats, Vardenvlei, 3·2 m E of Ottery, Cape Province (Rome 1965); pond on the Cape Flats (Sars 1924*a*)
Length : ♂ = 2·8 mm (Müller 1908); ♀ = 2·90 mm (Sars 1924*a*); amounting to 2·70 mm (Sars 1924*a*)

Parastenocypris anisocantha (Rome) 1965
Synonymy : Sta. 129, Albertinia, Cape Province (Rome 1965)
Length : ♂ = 2·88 mm, ♀ = 3·08 mm (Rome 1965)

Parastenocypris bispinosa (Müller) 1914
Locality : Chapmans Bay (Müller 1914)
Length : ♂ = 2·8–2·9 mm, ♀ = 3·0–3·15 mm (Müller 1914)

Parastenocypris declivis (Sars) 1924*a*
Locality : pond on the Cape Flats (Sars 1924*a*)
Length : ♀ = 2·60 mm (Sars 1924*a*)

? *Parastenocypris fascigera* (Sars) 1924*a*
Localities : Onolongo, Ukualuthi and Eunda in Ovamboland (Sars 1924*b*); 1·6 km NE of Tsotsoroga Pan, Kalahari (Barnard 1935)
Length : ♀ = 3·10 mm (Sars 1924*b*); 4 mm (Barnard 1935)

Parastenocypris hodgsoni (Sars) 1924*a*
Localities : vlei near Port Elizabeth; Cape Flats; near the whaling station at Saldanha Bay (Sars 1924*a*)
Length : amounting to 2·70 mm (Sars 1924*a*)

Parastenocypris pardalis (Sars) 1924*a*
Locality : grassy dried-up vlei on the Cape Flats (Sars 1924*a*)
Length : measuring 2·60 mm (Sars 1924*a*)

Parastenocypris pectinata (Sars) 1924*a*
Localities : Transvaal (Sars 1924*a*); Sta. 287, Kruger National Park, Leeu Pan, 24 km NE of Skukuza (Rome 1965)
Length : ♀ = 3·40 mm (Sars 1924*a*)

? *Parastenocypris perarmata* (Brady) 1904
Localities : near Greytown, Natal (Brady 1904); near Cape Town (Sars 1924*a*)
Length : 1·6 mm (Brady 1904); 2·00 mm (Sars 1924*a*)

Parastenocypris smaragdina (Sars 1924*a*)
Locality : a grassy dried-up vlei on the Cape Flats (Sars 1924*a*)
Length : amounting to 3·00 mm (Sars 1924*a*)

SUMMARY

The known South African freshwater Ostracoda, together with some interesting new records, are listed and taxonomic notes are appended. Two new tribes, Bradycyprini and Cypricercini, are proposed. An Appendix gives the locations of museum collections of South African freshwater ostracodes and includes other lists which were abstracted from the literature.

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Appendix One

Location of material

A. THE SOUTH AFRICAN MUSEUM

Species	No.	Locality	Det.
Homocypris conoidea Sars 1924	SAM A 3796	Cape Flats	?
	A11297–8	Cape Flats	G.O.S.
	A11742	Green Point Common	G.O.S.
Homocypris oblonga (Sars) 1924	SAM A11164	Cape of Good Hope	K.G.M.
	A11170	Cape of Good Hope	K.G.M.
	A11311	Port Elizabeth	K.G.M.
	A11891–2	Cape of Good Hope	K.G.M.
	A11945	Omaramba, South West Africa	D.H.E.
Liocypris grandis Sars 1924	6281	Bred from dried mud from Stompneus	D.H.E.
	SAM A11309	Stompneus Bay	G.O.S.
Bradycypris intumescens (Brady) 1907	SAM A11121	Green Point Common	D.H.E.
	A11146	Cape of Good Hope	G.O.S.
	A11163	Cape of Good Hope	D.H.E.
	A11172	Green Point Common	D.H.E.
	A11299	Ashton	G.O.S.
	A11300	SAMus EE	G.O.S.
	A11349	Kamieskroon	D.H.E.
	A11740	Port Elizabeth	G.O.S.
Paracypretta acanthifera Sars 1924	SAM A11135	Cape of Good Hope	G.O.S.
	A11276	Milnerton	G.O.S.
	A11277	Bergvliet, Cape Peninsula	G.O.S.
	A11280	SAMus B	G.O.S.
	A11747	Port Elizabeth	G.O.S.
	A11906	Tamansu, Ovamboland	D.H.E.
	A11953	Milnerton	D.H.E.
Paracypretta ampullacea Sars 1924	SAM A11154	Cape of Good Hope	D.H.E.

Species	No.	Locality	Det.
Sars 1924	SAM A11161	Green Point Common	G.O.S.
	A11278	SAMus R	G.O.S.
	A11279	Green Point Common	G.O.S.
	A11367	Green Point Common	D.H.E.
	A11748	SAMus	G.O.S.
	A11895	SAMus	D.H.E.
Paracypretta rubra Sars 1924	SAM A11155	Cape of Good Hope	D.H.E.
	A11281	Salt River	G.O.S.
	A11282	Cape Flats	G.O.S.
Cypricercus cuneatus Sars 1896	SAM A11137	Green Point Common	G.O.S.
	A11738	Green Point Common	G.O.S.
	A11961	Cape Flats	D.H.E.
Cypricercus episphaena Müller 1908	SAM A11140	Cape of Good Hope	D.H.E.
	A11293	Cape Town	G.O.S.
	A11294	SAMus EE	G.O.S.
	A11295	Green Point Common	G.O.S.
	A11737	SAMus	G.O.S.
	A11940	Green Point Common	D.H.E.
	A11954	Milnerton	D.H.E.
	A11962	Cape Flats	D.H.E.
Cypricercus maculatus Müller 1908	SAM A11296	Cape Flats	G.O.S.
Eucypris capensis (Müller) 1908	SAM A11288	Valkenberg Vlei	G.O.S.
	A11927–8	Valkenberg Vlei	D.H.E.
Eucypris corpulenta (Sars) 1896	SAM A11114	Knysna	G.O.S.
	A11117	Cape of Good Hope	G.O.S.
	A11732	Knysna	G.O.S.
	A11929–31	Valkenberg Vlei	D.H.E.
Eucypris hirta Sars 1924	SAM A11115–6	Cape of Good Hope	G.O.S.
	A11119	Cape of Good Hope	G.O.S.
	A11283	Cape Flats	G.O.S.

Species	No.	Locality	Det.
	A11284	Cape Flats	G.O.S.
	A11285	Cape Flats	G.O.S.
	A11729	Port Elizabeth	G.O.S.
Eucypris producta Sars 1924	SAM A11286	SAMus EE	G.O.S.
	A11312	Port Elizabeth	D.H.E.
Eucypris purcelli Sars 1924	SAM A11287	Ashton	G.O.S.
	A11730	Ashton	G.O.S.
Eucypris trichota Sars 1924	SAM A11731	SAMus EE	G.O.S.
	A11926	Valkenberg Vlei	D.H.E.
Pseudocypris circularis Sars 1924	SAM A11846–8	Kalahari	D.H.E.
	A11869	Onambeke, Ovamboland	D.H.E.
Pseudocypris expansa Sars 1924	SAM A11212	Kimberley	G.O.S.
Pseudocypris gibbera Sars 1924	SAM A11204	Eunda	G.O.S.
	A11205	Tamamsu	G.O.S.
	A11206	Tamamsu	G.O.S.
	A11207	Ukualuthi	G.O.S.
	A11208	Onolongo	G.O.S.
	A11209	Onambeke	G.O.S.
	A11210	Ukualonkathi	G.O.S.
	A11333	Eunda, Ovamboland	D.H.E.
	A11336	Onambeke, Ovamboland	D.H.E.
	A11337	Tamansu	D.H.E.
	A11351	Onambeke, Ovamboland	D.H.E.
	A11358	Ukualonkathi, Ovamboland	D.H.E.
	A11360–1	Onolongo, Ovamboland	D.H.E.
	A11853–4	Kalahari	D.H.E.
	A11856–7 11862	Ukualuthi, Ovamboland	G.O.S.
	A11883	Ondangua, Ovamboland	D.H.E.
	A11946	Omaramba, South West Africa	D.H.E.

Species	No.	Locality	Det.
Pseudocypris spinosa (Methuen) 1910	SAM A11197	Weltevreden West Pan, Transvaal	G.O.S.
Pseudocypris testudo Sars 1924	SAM A 3794	Cape Flats	D.H.E.
	A11213	Cape Flats	G.O.S.
	A11343	Valkenberg Vlei	D.H.E.
	A11876	SAMus EE	G.O.S.
Pseudocypris triquetra Sars 1924	SAM A11327	Narugus and Longklip, Gordonia	D.H.E.
	A11363–4	Kimberley	D.H.E.
	A11834	Du Toits Pan	D.H.E.
	A11836–7	Du Toits Pan	D.H.E.
Heterocypris aurea Sars 1896	SAM A11123	Green Point Common	G.O.S.
	A11141	Cape of Good Hope	G.O.S.
	A11142	Knysna	G.O.S.
	A11152	Cape of Good Hope	D.H.E.
	A11310	Port Elizabeth	G.O.S.
	A11735	Knysna	G.O.S.
Heterocypris capensis (Müller) 1908	SAM A 3795	Cape Flats	?
	A11165	Saldanha Bay	D.H.E.
	A11185	Saldanha Bay	D.H.E.
	A11185	Saldanha Bay	D.H.E.
	A11267	Ashton	G.O.S.
	A11331	Klip Vlei	D.H.E.
	A11733	Port Elizabeth	G.O.S.
	A11889	Port Elizabeth	D.H.E.
Heterocypris incongruens (Ramdohr) 1808	SAM A11120	Knysna	G.O.S.
	A11143	Cape of Good Hope	G.O.S.

Species	No.	Locality	Det.
	A11184	Cape of Good Hope	G.O.S.
	A11186	Near Kakamas, Orange River	?
	A11263	Cape Town	G.O.S.
	A11264	Prince Albert River	?
	A11734	Green Point Common	G.O.S.
Heterocypris ovularis (Sars) 1924	SAM A11265	Ongka	G.O.S.
	A11266	Ukualishi	G.O.S.
	A11356	Ongka, Ovamboland	D.H. E.
	A11373	Kalahari	D.H.E.
	A11863	Ukualuthi, Ovamboland	D.H.E.
Afrocypris barnardi Sars 1924	SAM A11289–90	Tamansu	G.O.S.
	A11291–2	Ukualishi	G.O.S.
	A11338	Tamansu, Ovamboland	D.H.E.
	A11339–40	Ukualuthi, Ovamboland	D.H.E.
	A11918	Eunda, Ovamboland	D.H.E.
Candonocypris candonoides (King) 1855	SAM A11321	Port Elizabeth (but see Sars 1924*a*: 177)	G.O.S.
Herpetocypris chevreuxi (Sars) 1896	SAM A11128	Cape of Good Hope	G.O.S.
	A11148	Cape of Good Hope	G.O.S.
	A11203	Cape of Good Hope	G.O.S.
	A11261	Kogmans Mountains	G.O.S.
	A11262	Prince Albert River	G.O.S.
	A11328	Tank near Witsands Beach	D.H.E.
	A11329	Bosluiskloof, Swartberg	D.H.E.
	A11332	Vogelfontein, Prince Albert	D.H.E.
	A11886	Bosluiskloof, Swartberg	D.H.E.
Isocypris nivea Sars 1924	SAM A11165	Cape of Good Hope	D.H.E.
	A11741	SAMus	G.O.S.
	A11743	Green Point Common	G.O.S.
	A11301	Green Point Common	G.O.S.

Species	No.	Locality	Det.
Sars 1924	SAM A11302	SAMus R	G.O.S.
	A11941	Green Point Common	D.H.E.
Isocypris perangusta Müller 1908	SAM A11173	Port Elizabeth	D.H.E.
Isocypris priomena Müller 1908	SAM A11174	Cape of Good Hope	D.H.E.
	A11176	Klipdam, near Kimberley	D.H.E.
	A11177	Green Point Common	D.H.E.
	A11308	Prince Albert	G.O.S.
	A11317	Port Elizabeth	D.H.E.
	A11932	Stompneus	?
	A11942	Green Point Common	D.H.E.
Apatelecypris brevis (Sars) 1924	SAM A11194	South West Africa	D.H.E.
	A11275	Namutoni, South West Africa	G.O.S.
	A11369	Tesfontein	D.H.E.
	A11370	Otjitundua, Kaokoveld, South West Africa	D.H.E.
	A11371	? Otavi	?
	A11372	Ongka, Ovamboland	D.H.E.
	A11377	Belina	?
	A11830–1	South West Africa 3	D.H.E.
	A11936	Namutoni, South West Africa	D.H.E.
Megalocypris durbani (Baird) 1862	SAM A11133	Cape of Good Hope	G.O.S.
	A11272	Port Elizabeth	G.O.S.
	A11322–6	Port Elizabeth	G.O.S.
	A11334	Thornhill, Port Elizabeth	D.H.E.
	A11352	Grahamstown	D.H.E.
	A11744–5	Port Elizabeth	G.O.S.
	A11838–9	Port Elizabeth	G.O.S.
Megalocypris hispida Sars 1924	SAM A11274	Cape Flats	G.O.S.
	A11844–5	Cape Flats	G.O.S.
	A11868	Milnerton	D.H.E.
	A11877	Cape Flats	D.H.E.

Species		No.	Locality	Det.
Megalocypris princeps Sars 1898	SAM	1479	Green Point, Cape Division	D.H.E.
		6274	Between Retreat and Zeekoe Vlei, Cape Flats	?
		6275	Near Retreat station (shallow ponds and streams E of station)	?
	SAM	A 2641	Milnerton	?
		A 4241	Cape Flats	?
		A11134	Cape of Good Hope	G.O.S.
		A11268–71	Green Point Common	G.O.S.
		A11376	Milnerton	D.H.E.
		A11529	?	?
		A11746	SAMus	G.O.S.
		A11840–1	Cape of Good Hope	G.O.S.
Sclerocypris clavularis Sars 1924	SAM	A11118	Klipdam, near Kimberley	G.O.S.
		A11200	Kimberley	G.O.S.
		A11739	Klipdam, near Kimberley	G.O.S.
Sclerocypris exserta Sars 1924	SAM	A11190	Reinwastmak, Molopo River	?
		A11235	Eunda	G.O.S.
		A11236	Ukyalashi River	G.O.S.
		A11237	Onambeke	G.O.S.
		A11238	Ovamboland	G.O.S.
		A11239	Ukualishi	G.O.S.
		A11240	Andoni	G.O.S.
		A11241	Ukualishi	G.O.S.
		A11242	Onolongo	G.O.S.
		A11341	Onolongo	G.O.S.
		A11368	Achabdam, Molopo River (as cf. *exserta*)	D.H.E.
		A11870–1	Onambeke, Ovamboland	D.H.E.
Sclerocypris major Sars 1924	SAM	A11243	Onolongo	G.O.S.
		A11244	Ukualishi	G.O.S.
		A11245	Tsumeb, South West Africa	G.O.S.

Species	No.	Locality	Det.
Sars 1924	SAM A11246	Eunda	G.O.S.
	A11355	Ukualuthi, Ovamboland	D.H.E.
	A11359	Tsumeb, South West Africa	D.H.E.
	A11858	Tamansu, South West Africa	G.O.S.
	A11859–60	Ukualuthi, Ovamboland	G.O.S.
	A11861	Onolongo, Ovamboland	D.H.E.
	A11866	Ukualuthi, Ovamboland	G.O.S.
Sclerocypris superba Sars 1924	SAM A11247	Andoni	G.O.S.
	A11248	Eunda	G.O.S.
	A11881	Eunda, Ovamboland	G.O.S.
	A11915–6	Eunda, Ovamboland	D.H.E.
Sclerocypris tuberculata (Sars) 1924	SAM A11273	Kimberley	G.O.S.
	A11362	Kimberley	D.H.E.
	A11842–3	Kimberley	G.O.S.
	A11849–50	Kalahari	D.H.E.
Parastenocypris ametra typica (Müller) 1908	SAM A11166	Cape of Good Hope	D.H.E.
	A11255	Salt River	D.H.E.
	A11313	Port Elizabeth	D.H.E.
	A11867	Milnerton	D.H.E.
Parastenocypris declivis (Sars) 1924	SAM A11939	Green Point Common	D.H.E.
	A 3797–8	Cape Flats	D.H.E.
? *Parastenocypris fascigera* (Sars) 1924	SAM A11249–52	Ukualishi	G.O.S.
	A ?	Onolongo	G.O.S.
	A11851–2	Kalahari	D.H.E.
	A11864	Ukualuthi, Ovamboland	D.H.E.
Parastenocypris hodgsoni (Sars) 1924	SAM A11126	Cape of Good Hope	G.O.S.
	A11193	Salt River	G.O.S.

Species	No.	Locality	Det.
	A11256–8	Salt River	G.O.S.
	A11899–900	Cape of Good Hope	D.H.E.
Parastenocypris pardalis	A11167	Cape of Good Hope	D.H.E.
(Sars) 1924	SAM A11254	Cape Flats	D.H.E.
	A11902–3	Green Point Common	D.H.E.
Parastenocypris pectinata (Sars) 1924	SAM A 4795	Junction Marico and Crocodile Rivers, Transvaal	D.H.E.
	A11259	Junction Marico and Crocodile Rivers	? G.O.S.
? *Parastenocypris perarmata* (Brady) 1904	SAM A11153	Cape of Good Hope	D.H.E.
Parastenocypris smaragdina (Sars) 1924	SAM A11124–5	Cape of Good Hope	G.O.S.
	A11127	Cape of Good Hope	G.O.S.
	A11253	Cape Flats	G.O.S.
	A11901	Cape Flats	D.H.E.
Oncocypris voeltzkowi Müller 1898	SAM A11374	King William's Town District	D.H.E.
	A11375	Milnerton	
Cyprilla arcuata Sars 1924	SAM A11158	Cape of Good Hope	G.O.S.
	A11160	Green Point Common	G.O.S.
	A11305		G.O.S.
Cyprilla deflexa Sars 1924	SAM A11314	Port Elizabeth	G.O.S.
	A11912	King William's Town District	D.H.E.
Cyprilla gibbula Sars 1924	SAM A11156	Cape of Good Hope	G.O.S.
Cyprilla humilis Sars 1924	SAM A11306		G.O.S.
	A11963–5	Eight km NW of Leliefontein, Namaqualand	D.H.E.

Species	No.	Locality	Det.
Cyprilla producta Sars 1924	SAM A11162	Klipdam, near Kimberley	G.O.S.
'*Cypridopsis*' *aculeata* (Costa) 1847	SAM A11132	Cape of Good Hope	G.O.S.
	A11215	SAMus C	?
'*Cypridopsis*' *clavata* Sars 1924	SAM A11230	? Tomas River	G.O.S.
	A11913	King William's Town District	D.H.E.
'*Cypridopsis*' *echinata* Müller 1908	SAM A11224–5	SAMus R	G.O.S.
	A11318	Port Elizabeth	G.O.S.
	A11905	Cape Flats	D.H.E.
	A11944	Green Point Common	D.H.E.
'*Cypridopsis*' *elizabethae* Sars 1924	SAM A11226–7	Muds from Sak River, Frazerburg	G.O.S.
	A11320	Port Elizabeth	G.O.S.
'*Cypridopsis*' *glabrata* Sars 1924	SAM A11749	Saldanha Bay	D.H.E.
'*Cypridopsis*' *gregaria* (Sars) 1896	SAM A11130	Cape of Good Hope	G.O.S.
	A11145	Knysna	G.O.S.
	A11217	SAMus A	G.O.S.
	A11218	Salt River	?
	A11219	SAMus A	?
	A11736	SAMus	G.O.S.
	A11319	Port Elizabeth	G.O.S.
'*Cypridopsis*' *hirsuta* Sars 1924	SAM A11234	Ashton	D.H.E.
	A11966	Eight km NW of Leliefontein, Namaqualand	D.H.E.

Species	No.	Locality	Det.
Cypridopsis' ochracea Sars 1924	SAM A11220–1	Salt River	?
	A11727	SAMus	G.O.S.
	A11967	Eight km NW of Leliefontein, Namaqualand	D.H.E.
'Cypridopsis' punctata Sars 1924	SAM A11228	Kogmans River, Montagu	G.O.S.
	A11229	South West Africa	G.O.S.
'Cypridopsis' pygmaea Sars 1924	SAM A11202	Cape of Good Hope	G.O.S.
Cypridopsis' spinifera Sars 1924	SAM A11138	Green Point Common	D.H.E.
	A11139	Cape of Good Hope	D.H.E.
	A11231	Cape Flats	D.H.E.
	A11232	SAMus EE	D.H.E.
	A11943	Green Point Common	D.H.E.
	A11972	South Africa	D.H.E.
'Cypridopsis' striolata Sars 1924	SAM A11131	Cape of Good Hope	G.O.S.
	A11201	Cape of Good Hope	G.O.S.
'Cypridopsis' tonsa Sars 1924	SAM A11179	Ashton	G.O.S.
'Cypridopsis' trigonella Sars 1924	SAM A11129	Green Point Common	G.O.S.
	A11904	Green Point Common	D.H.E.
Cypridopsis assimilis Sars 1896	SAM A11315	Port Elizabeth	G.O.S.
Cypridopsis intermedia (Sars) 1924	SAM A11180	Cape of Good Hope	D.H.E.
Cypridopsis viduella Sars 1896	SAM A11171	Klipdam, near Kimberley	G.O.S.

Species	No.	Locality	Det.
Plesiocypridopsis cf. *aldabrae* (Müller) 1898	SAM A 5940–2	Omaramba, South West Africa	K.G.M.
	A11178	South West Africa	K.G.M.
	A11180	Reimvastmak, Molopo River	K.G.M.
	A11222	Otjituo	G.O.S.
	A11223	Kimberley	G.O.S.
	A11354	Otjitundua, Kaokoveld, South West Africa	K.G.M.
	A11879–80	Ongka, Ovamboland	K.G.M.
	A11947	Omaramba, South West Africa	D.H.E.
	A11955	Otjikundua, South West Africa	K.G.M.
Zonocypris cordata Sars 1924	SAM A11144	Cape of Good Hope	G.O.S.
	A11316	Port Elizabeth	G.O.S.
	A11894	SAMus	D.H.E.
Zonocypris tuberosa Müller 1908	SAM A11149	?	D.H.E.
Cypretta globulus (Sars) 1889	SAM A11182	Cape of Good Hope	D.H.E.
Cypretta turgida (Sars) 1895	SAM A11150	Port Elizabeth	D.H.E.
	A11159	Cape of Good Hope	G.O.S.
	A11183	South West Africa	D.H.E.
	A11198–9	Cape of Good Hope	G.O.S., D.H.E.
	A11897	Green Point Common	D.H.E.
	A11898	South West Africa	D.H.E.
Ilyocypris australiensis Sars 1889	SAM A11168	Cape of Good Hope	D.H.E.
	A11890	Prince Albert Division, Cape Province	G.O.S.
	A11956–8	Vogelfontein, Prince Albert Division	D.H.E.

Species	No.	Locality	Det.
Physocypria capensis (Sars) 1896	SAM A11122	Knysna	D.H.E.
	A11136	Cape of Good Hope	G.O.S.
	A11883	SAMus	D.H.E.
	A11911	King William's Town District	D.H.E.
Gomphocythere expansa Sars 1924	SAM A11303	SAMus J	G.O.S.
	A11304	SAMus J	G.O.S.

B. THE SOUTH AFRICAN MUSEUM—UNIDENTIFIED MATERIAL

No.	Species	Locality
SAM A11147	*Pseudocypris* sp.	?
A11151	'*Cypris*' sp. (juv.)	?
A1169	'*Stenocypris*' sp.	Cape of Good Hope
A11187	*Heterocypris* sp.	South West Africa
A11188	*Pseudocypris* sp.	?
A11189	*Pseudocypris* sp.	South West Africa
A11191	*Isocypris* sp. (4 ♂s)	?
A11192	*Isocypris* sp.	South West Africa
A11211	'*Cypris latissima* (Müller)'	Junction of Marico and Crocodile Rivers, Transvaal
A11214	*Pseudocypris* sp.	Onambeke
A11260	'*Stenocypris*' sp.	Cape Flats
A11330	*Heterocypris* sp.	Willowmore
A11344	'*Cypris*' sp.	King William's Town District
A11346	*Megalocypris* sp. (juv.)	Melkbos Strand, road puddle
A11347	'*Cypridopsis*' sp.	Kimberley
A11348	'*Cypridopsis*' sp.	Kimberley
A11350	*Heterocypris* sp.	Kalkfontein, South West Africa
A11353	*Heterocypris* sp.	Vaalhoek, Kakamas
A11357	*Heterocypris* sp.	Ongka, Ovamboland
A11365	'*Cypridopsis*' sp.	Fraserberg, Sak River
A11366	'*Cypridopsis*' sp.	Reimvastmak, Molopo River
A11619	'*Stenocypris*' sp.	Port Elizabeth
A11620	'*Cypris*' sp.	Kimberley
A11624	*Heterocypris* sp.	?
A11833	Ostracod sp.	Du Toit's Pan
A11865	*Sclerocypris* n. sp.	Ukualuthi, Ovamboland

No.	Species	Locality
A11873	*Sclerocypris* n. sp.	Ukualuthi, Ovamboland
A11874	*Pseudocypris* sp.	Grahamstown
A11875	*Pseudocypris* sp.	?
A11878	*Sclerocypris* n. sp.	Ukualonkathi, Ovamboland
A11882	*Sclerocypris* sp.	Ondongua, Ovamboland
A11884	*Pseudocypris* sp.	Ongka, N of Ondongwa, Ovamboland
A11887	'*Cypridopsis*' sp.	Bosluiskloof, Swartberg
A11888	?	Willowmore
A11896	Ostracod sp.	Green Point Common
A11907	*Sclerocypris* sp.	Tamansu, Ovamboland
A11909–10	*Oncocypris* sp.	King William's Town District
A11917	*Sclerocypris* n. sp.	Eunda, Ovamboland
A11919	Ostracod sp.	Eunda, Ovamboland
A11914 A11920	'*Cypridopsis*' sp.	Kamieskroon, Namaqualand
A11921–3	'*Cypridopsis*' sp.	Kamieskroon, Namaqualand
A11924	*Megalocypris* sp. (juv.)	Valkenberg Vlei
A11925	*Cypricercus* sp. (juvs.)	Valkenberg Vlei
A11933	*Heterocypris* sp.	Kimberley
A11934	*Pseudocypris* sp.	Kimberley
A11937–8	?	Junction of Marico and Crocodile Rivers
A11948	*Heterocypris* sp.	Kimberley
A11951	'*Stenocypris*' n. sp.	Klip Vlei near Garies
A11952	'*Cypridopsis*' sp.	Klip Vlei, near Garies
A11959	'*Cypridopsis*' sp.	Vogelfontein, Prince Albert Division
A11960	Candoninid sp.	Vogelfontein, Prince Albert Division
A11969–71	*Isocypris* n. sp.	Kalkfontein south, South West Africa
A11973–4	'*Cypridopsis*' sp.	South Africa
A11975	*Heterocypris* sp.	South Africa

C. NATAL MUSEUM

Species	No.	Locality	Det.
Mesocypris terrestris Harding 1953	375	Knysna Forest	J.P.H.

D. BRITISH MUSEUM (NATURAL HISTORY)

Species	No.	Locality	Det.
'Cypridopsis' gregaria (Sars) 1896	1901.12.12.144–50	Knysna	G.O.S.
	1958.10.2.24	Namaqualand, 9·6 km S of Garies	D.H.E.
Eucypris capensis (Müller) 1908	1958.10.2.19.20	Cape Flats, 5·6 km E of Philippi	D.H.E.
Pseudocypris circularis Sars 1924	1958.10.2.18	Makarikari Expedition	D.H.E.
Pseudocypris testudo Sars 1924	1953.3.28.1	Grahamstown	H.M.F.
	1951.6.2.1–4a	Grahamstown	H.M.F.
Heterocypris aurea (Sars) 1896	1901.12.12.130–5	Knysna	G.O.S.
Afrocypris barnardi Sars 1924	1932.2.25.217–19	Tamansu, South West Africa	G.O.S.
Megalocypris durbani (Baird) 1862	1945.9.26.116–20	Near Cape Town	W.B.
Megalocypris hispida Sars 1924	1958.10.2.26	14·5 km NE of Cape Town	D.H.E.
Megalocypris princeps Sars 1898	1901.12.12.121	Cape of Good Hope	G.O.S.
Mesocypris terrestris Harding 1953	1953.1.2.1–9	Knysna Forest	J.P.H.

In addition, as yet unregistered material collected by Prof. J. Lochhead and found in the collection of the late Prof. P. F. Holmes. This material includes *Megalocypris hispida* Sars 1924, raised from mud from Riella Vlei; and in two tubes, in which the localities are given simply as South Africa and South African mud, the species: *Cyprilla humilis* Sars 1924, *Heterocypris capensis* (Müller) 1908, *Cypricercus episphaena* Müller 1908, *Eucypris capensis* (Müller) 1908, *Megalocypris hispida* Sars 1924, *Parastenocypris* sp., *Pseudocypris* sp. (juv.) and '*Cypridopsis*' spp. Determinations by K. G. McKenzie.

E. THE STATE MUSEUM, SOUTH WEST AFRICA

Species	Locality
Sclerocypris n. sp.	Hoanib River, about 6·4 km inland from the mouth
Sclerocypris cf. *exserta* Sars 1924	Ekuma River, on the northern margin of Etosha Pan
Plesiocypridopsis sp.	Ombika spring, Etosha Pan
Heterocypris sp.	Ombika spring, Etosha Pan
‘*Cypridopsis*’ sp.	Kunene River, near mouth
Cypridopsis’ sp.	Namus Kluft, 10 km E of Rosh Pinah Mine

Determinations by K. G. McKenzie.

Dr. H. W. Schäfer has on loan several other ostracode collections made by this museum.

F. SWEDISH STATE MUSEUM OF NATURAL HISTORY, STOCKHOLM

Species	No.	Locality
Apatelecypris brevis (Sars) 1924	102	Near Otjimbingue, Damaraland, South West Africa
Megalocypris princeps Sars 1898	110	Great marsh on the plain, Cape Town, South Africa

Determinations by S. Lindroth (1953).

G. ZOOLOGISCHES MUSEUM, HAMBURG

Species	No.	Locality	Det.
Limnocythere aethiopica Klie 1934	77 DP 77a, b	Banagher Pan, Lake Chrissie District, Transvaal	W.K.
Plesiocypridopsis inaequivalva (Klie) 1933	1098–1102 DP 1098a–1100a DP 1101a, b; 1102a	Lake Chrissie, Transvaal, and 4 nearby pans	W.K.
	27655	Lake Chrissie, Transvaal	G.H.
‘*Cypridopsis*’ *katesae* Hartmann 1957	27656–7	Gibeon, Great Namaqualand	G.H.
Cyprilla producta Sars 1924	27674	Lake Chrissie, Transvaal	G.H.
Tanycypris obtusa (Klie) 1933	1071 DP 1071a	Weltevreden West Pan, Lake Chrissie District, Transvaal	W.K.

Species	No.	Locality	Det.
Gesa dubia Hartmann 1957	27673	Lake Chrissie, Transvaal	G.H.
Heterocypris congener Vávra 1897	27503	Lake Chrissie, Transvaal	G.H.
Sclerocypris biconica (Klie) 1933	769 DP 769a, b	Blouwater Pan 4, Lake Chrissie District, Transvaal	W.K.
Chrissia levetzovi Hartmann 1957	27668	Lake Chrissie, Transvaal	G.H.

H. THE ZOOLOGICAL MUSEUM, OSLO—SPIRIT COLLECTION

Species	No.	Locality	Det.
Gomphocythere expansa Sars 1924	F 4343	Cape of Good Hope III	G.O.S.
Gomphocythere obtusata	F 4344	SAMus, Salt River duckpond	,,
(Sars) 1910	4345	Saldanha Bay	,,
Limnocythere sp.	F 4354	Cape of Good Hope III	,,
Cyclocypris pusilla Sars 1896	F 4320	Knysna	,,
Physocypria capensis (Sars) 1896	F 4324	Knysna	,,
Cypridopsis assimilis Sars 1896	F 4329	Knysna	,,
Cypridopsis viduella	F 4332	Knysna	,,
Sars 1896	4346	Cape of Good Hope III	,,
**Cypridopsis* sp.	F 4331	Cape of Good Hope IV–VI	,,
Cypridopsis sp.	F 4355	Cape of Good Hope III	,,
Cypridopsis sp.	F 4356	Saldanha Bay	,,
'*Cypridopsis*' *gregaria*	F 4330	Cape of Good Hope I	,,
(Sars) 1896	4347	Knysna	,,
Cyprilla arcuata	F 4333	Cape of Good Hope IV–VI	,,
Sars 1924	4334	Cape of Good Hope VI	,,
Cyprilla gibbula Sars 1924	F 4335	Cape of Good Hope II	,,
Cypretta globulus	F 4321	Cape of Good Hope	,,
(Sars) 1889	4322	Cape of Good Hope VI	,,
Cypretta turgida (Sars) 1896	F 4323	Cape of Good Hope	,,
Cypricercus cuneatus Sars 1924	F 4326–7	Knysna	,,

Species	No.	Locality	Det.
**Cypricercus* sp.	F 4325	Cape of Good Hope	G.O.S.
**Cypricercus* sp.	F 4328	Port Elizabeth	,,
Eucypris corpulenta (Sars) 1896	F 4337	Knysna	,,
Eucypris trigona (Sars) 1896	F 4339	Knysna	,,
**Cypris* sp.	F 4338	Port Elizabeth	,,
Cypris sp.	F 4351–2	Cape of Good Hope II	,,
Cypris sp.	F 4353	Port Elizabeth	,,
Heterocypris aurea (Sars) 1896	F 4336	Knysna	,,
**Heterocypris* sp.	F 4341	Cape of Good Hope I	,,
**Heterocypris* sp.	F 4342	Cape of Good Hope III	,,
Herpetocypris chevreuxi (Sars) 1898	F 4340	Cape of Good Hope III	,,
Parastenocypris hodgsoni (Sars) 1924	F 4348–9	Port Elizabeth	,,
**Parastenocypris smaragdina* (Sars) 1924 subsp.	F 4350	Cape of Good Hope	,,

The asterisked entries indicate species and a subspecies with manuscript names. In some instances, these manuscript names are homonymous with described species.

I. THE ZOOLOGICAL MUSEUM, OSLO—SLIDE COLLECTION

Species	No.	Locality	Det.
Gomphocythere expansa Sars 1924	F 11134–7	Cape of Good Hope III	G.O.S.
Gomphocythere obtusata	F 11127	SAMus A	,,
(Sars) 1910	11128–30	Saldanha Bay	,,
	11131	Cape of Good Hope	,,
	11132	Salt River	,,
	11133	SAMus A	,,
	11139	Saldanha Bay	,,
**Limnocythere* sp.	F 11138	South West Africa	,,
**Cythere* sp.	F 11358	Port Elizabeth	,,
Physocypria capensis	F 10858		,,
(Sars) 1896	10859	Cape of Good Hope I	,,
	10860		,,
	10861	Saldanha Bay II	,,
	10862	Cape of Good Hope III	,,

Species	No.	Locality	Det.
Physocypria capensis	10863	Knysna	G.O.S
(Sars) 1896	10864		,,
**Cypria* sp.	F 11355	Port Elizabeth	,,
Cypridopsis assimilis	F 11257–9	Port Elizabeth	,,
Sars 1896	11260		,,
	11364	Port Elizabeth	,,
Cypridopsis viduella	F 11261		,,
Sars 1896	11262	Cape of Good Hope III	,,
	11263	Port Elizabeth	,,
	11264–5	Knysna	,,
	11266	Cape of Good Hope VI	,,
**Cypridopsis* sp.	F 11267	Cape of Good Hope III	,,
**Cypridopsis* sp.	F 11268	Cape of Good Hope V	,,
**Cypridopsis* sp.	F 11016		,,
	11017	SAMus A	,,
	11057		,,
	11058	Salt River	,,
**Cypridopsis* sp.	F 11082	Port Elizabeth	,,
**Cypridopsis* sp.	F 11047	Cape of Good Hope	,,
	11048		,,
	11078	Cape of Good Hope III	,,
**Cypridopsis* sp.	F 11018	SAMus R	,,
	11019		,,
	11020	SAMus Q	,,
	11021	Cape of Good Hope III	,,
	11022	Port Elizabeth 3	,,
	11023	Green Point Common	,,
**Cypridopsis* sp.	F 11000a	Thomas River	,,
	11000b,	SAMus E	,,
	11001		
	11000c	Thomas River, SAMus	,,
**Cypridopsis* sp.	F 11012	Saldanha Bay	,,
**Cypridopsis* sp.	F 11042–6	Saldanha Bay	,,
**Cypridopsis* sp.	F 11077	Port Elizabeth	,,
**Cypridopsis* sp.	F 11064	Cape of Good Hope VI	,,
	11065–7	Port Elizabeth	,,
	11068	Cape of Good Hope VI	,,
	11069a, b	Port Elizabeth	,,
**Cypridopsis* sp.	F 11026	Cape of Good Hope II	,,
	11027		,,
	11028	Cape of Good Hope II	,,
	11029	Cape of Good Hope I	,,
	11030		,,

Species	No.	Locality	Det.
**Cypridopsis* sp.	F 11059–60	SAMus R	G.O.S.
**Cypridopsis* sp.	F 11375–6		,,
**Cypridopsis* sp.	F 11049	Green Point Common	,,
**Cypridopsis* sp.	F 11039	Cape of Good Hope VI	,,
	11040	Cape of Good Hope IV–VI	,,
	11041	Cape of Good Hope VI	,,
	11042	Port Elizabeth	,,
**Cypridopsis* sp.	F 11072	SAMus R	,,
**Cypridopsis* sp.	F 11083	Saldanha Bay	,,
	11084	Saldanha Bay I	,,
**Cypridopsis* (*Potamocypris*) sp.	F 11032–3	South Africa	,,
**Potamocypris* sp.	F 11220–1		,,
	11222	Knysna	,,
	11223		,,
	11224–6	Knysna	,,
*cypridopsine sp.	F 11230	Port Elizabeth	,,
'*Cypridopsis*' *elizabethae* Sars 1924	F 10994	Port Elizabeth	,,
	10995 (♂)		,,
	10996	Port Elizabeth	,,
	10997–9	Port Elizabeth	,,
'*Cypridopsis*' *glabrata* Sars 1924	F 11079	Saldanha Bay	,,
	9315 (♀)	Saldanha Bay	,,
'*Cypridopsis*' *gregaria* (Sars) 1896	F 10967	Port Elizabeth	,,
	10968	Knysna	,,
	10969	Port Elizabeth	,,
	10970	Cape of Good Hope III	,,
	10971	Cape of Good Hope I	,,
	10972	Cape of Good Hope	,,
	10973–4	Knysna	,,
	10975	Saldanha Bay	,,
	10976	Saldanha Bay 6	,,
	10977	Port Elizabeth	,,
	10978	Saldanha Bay	,,
	10979	Knysna	,,
	10992	Port Elizabeth	,,
	10993	Knysna	,,
	11611	Victoria (?) Bay	,,
	12034		,,
'*Cypridopsis*' *hirsuta* Sars 1924	F 11024–5	Ashton	,,

Species	No.	Locality	Det.
'*Cypridopsis*' *ochracea*	F 11004	SAMus D	G.O.S.
Sars 1924	11005	Saldanha Bay	,,
	11006	SAMus A + D	,,
	11007	SAMus A	,,
	11008	Salt River	,,
	11009–10		,,
	11011–3	Saldanha Bay	,,
	11014–5	Saldanha Bay I	,,
'*Cypridopsis*' *punctata* Sars 1924	F 11075	Otjituo	,,
'*Cypridopsis*' *pygmaea* Sars 1924	F 11076	Cape of Good Hope II	,,
'*Cypridopsis*' *reniformis*	F 11031	Fish Hoek	,,
Sars 1924	11354		
'*Cypridopsis*' *spinifera*	F 11054–5	SAMus EE	,,
Sars 1924	11056	SAMus E	,,
'*Cypridopsis*' *striolata* Sars 1924	F 11070–1	Cape of Good Hope II	,,
'*Cypridopsis*' *tonsa*	F 11061	SAMus EE	,,
Sars 1924	11062	Cape of Good Hope VI	,,
	11063	Ashton	,,
'*Cypridopsis*' *trigonella*	F 11050	Ashton	,,
Sars 1924	11051	SAMus C	,,
	11052	SAMus A	,,
	11053	Cape of Good Hope VI	,,
'*Cypridopsis*' *tumidula* Sars 1924	F 11074	Port Elizabeth	,,
Cyprilla arcuata	F 10938–9	Cape of Good Hope II	,,
Sars 1924	10940	Cape of Good Hope VI	,,
	10941	Cape of Good Hope	,,
	10944		,,
Cyprilla deflexa Sars 1924	F 10925–31	Port Elizabeth	,,
Cyprilla gibbula	F 10919	Cape of Good Hope VI	,,
Sars 1924	10920		,,
	10921		,,
Cyprilla humilis Sars 1924	F 10922–4	SAMus D	,,
**Cyprilla* sp.	F 10933		,,
	10934	Ashton	,,
	10935–7		,,
	10945		,,

Species	No.	Locality	Det.
*_Cyprilla_ sp.	F 10946–7	Klipdam	G.O.S.
*_Cyprilla_ sp.	F 10932	Cape of Good Hope IV	,,
*_Cyprilla_ sp.	F 10944	Cape of Good Hope	,,
Zonocypris cordata	F 11334	Cape of Good Hope II	,,
Sars 1924	11335	Cape of Good Hope	,,
	11363	Port Elizabeth	,,
*_Zonocypris_ sp.	F 11336–7	Cape of Good Hope II	,,
	11338		,,
	11339		,,
	11340		,,
	11341		,,
Cypretta globulus	F 11109	Cape of Good Hope V	,,
(Sars) 1889	11629	Victoria B (? = Bay)	,,
Cypretta turgida	F 11106–7	Cape of Good Hope VI	,,
(Sars) 1895			
Paracypretta acanthifera	F 11248		,,
Sars 1924	11249		,,
	11250		,,
	11251		,,
	11252		,,
Paracypretta ampullacea	F 11253–5	SAMus	,,
Sars 1924			
Paracypretta rubra	F 11256	Cape of Good Hope III	,,
Sars 1924			
Homocypris conoidea	F 11210	Cape of Good Hope III	,,
Sars 1924			
Homocypris oblonga	F 11187		,,
(Sars) 1924	11188–9	Otjituo, South West Africa	,,
*_Homocypris_ sp.	F 11208	Cape of Good Hope III	,,
	11209		,,
Cypricercus cuneatus	F 10956	Cape of Good Hope III	,,
Sars 1896	10957–8		,,
	11368	Knysna	,,
*_Cypricercus_ sp.	F 10949–51		,,
	10952	SAMus	,,
	10953	SAMus EE	,,
	10954–5	Cape of Good Hope	,,
	11117	SAMus	,,
*_Cypricercus_ sp.	F 10960–2	Ashton	,,
*_Amphicypris_ sp.	F 10857	Port Elizabeth	,,
Eucypris corpulenta	F 10872–8	Knysna	,,
(Sars) 1896	11119	Klipdam	,,

Species	No.	Locality	Det.
Eucypris hirta Sars 1924	F 10904	Cape of Good Hope II	G.O.S.
	10905–6	SAMus EE	,,
	10907–9	Cape of Good Hope II	,,
	11122	SAMus EE	,,
Eucypris producta Sars 1924	F 11123	Port Elizabeth	,,
Eucypris purcelli Sars 1924	F 10901–3	Ashton	,,
	11120–1	Ashton	,,
Pseudocypris circularis Sars 1924	F 11584		,,
Pseudocypris gibbera Sars 1924	F 10894–5	Odongua	,,
	10896–7	Otjituo, South West Africa	,,
	11927		,,
	12090		,,
	12091		,,
	12092		,,
	12093		,,
Pseudocypris testudo Sars 1924	F 11272	SAMus EE	,,
**Pseudocypris* sp.	F 11273–6	Kimberley	,,
**Cypris* sp.	F 10880	Port Elizabeth	,,
**Cypris* sp.	F 10881–2	Port Elizabeth	,,
**Cypris* sp.	F 10879	Knysna	,,
**Cypris* sp.	F 10885	SAMus EE	,,
	10886–7	Cape of Good Hope	,,
**Hemicypris* sp.	F 11202	Knysna, Cape of Good Hope	,,
	11203–4	Knysna	,,
	11205		,,
	11206–7	Knysna	,,
Heterocypris aurea (Sars) 1896	F 11182	Ashton	,,
	11183–4	Knysna	,,
	11185	Saldanha Bay I	,,
	11186	Knysna	,,
	11099	Knysna	,,
	11100	Ashton	,,
Heterocypris ovularis (Sars) 1924	F 12046		,,
**Heterocypris* sp.	F 11194	Otjituo, South West Africa	,,
**Heterocypris* sp.	F 11178	Knysna	,,
	11179		,,
	11180	Knysna	,,
	11181	Knysna, Cape of Good Hope I	,,

Species	No.	Locality	Det.
**Heterocypris* sp.	F 11199	Saldanha Bay	G.O.S.
**Heterocypris* sp.	F 11190	Saldanha Bay 2	,,
	11191–2		,,
	11193	Saldanha Bay 2	,,
**Cyprinotus* sp.	F 11103	II	,,
	11366	Cape of Good Hope II	,,
**Cyprinotus* sp.	F 11095–8	Port Elizabeth	,,
Herpetocypris chevreuxi (Sars) 1898	F 11173–6	Cape of Good Hope III	,,
Isocypris nivea	F 11216	SAMus EE	,,
Sars 1924	11217	Cape of Good Hope	,,
	11238		,,
	11239		,,
	11240–3	Green Point Common	,,
	11244	Ashton	,,
	11245		,,
	11246–7	Green Point Common	,,
**Isocypris* sp.	F 11218	Port Elizabeth	,,
	11231–2	Klipdam	,,
	11233		,,
	11234	Cape of Good Hope IV	,,
	11235		,,
	11236	Green Point Common	,,
	11237	Cape of Good Hope II	,,
	11367	Cape of Good Hope II	,,
Apatelecypris brevis	F 11166–8	South West Africa	,,
(Sars) 1924	11580		,,
Megalocypris hodgsoni	F 11149	Port Elizabeth	,,
Sars 1924	11150		,,
	11151–2	Port Elizabeth	,,
	11153		,,
Megalocypris hispida Sars 1924	F 11157–8	Cape Flats	,,
Megalocypris princeps Sars 1924	F 11170	Cape of Good Hope	,,
**Megalocypris* sp.	F 11169	South West Africa	,,
	12084		,,
	12085		,,
	12086		,,
**Megalocypris* sp.	F 11154–6		,,
Sclerocypris clavularis Sars 1924	F 10898–900	Klipdam	,,

Species	No.	Locality	Det.
Sclerocypris tuberculata (Sars) 1924	F 11164–5	Kimberley	G.O.S.
Sclerocypris major Sars 1924	F 11329–30	South West Africa	,,
	11586	Ukualishi	
? *Parastenocypris fascigera* (Sars) 1924	F 11321	Ondongua	,,
	12107–10		,,
	12111		,,
Parastenocypris hodgsoni (Sars) 1924	F 11293–4	Cape of Good Hope	,,
	11295	SAMus 98	,,
	11296	SAMus	,,
	11297		,,
	11298		,,
	11299		,,
	11300–7	Port Elizabeth	,,
Parastenocypris olivacea (Sars) 1924	F 11318–9	Brock P	,,
Parastenocypris pardalis (Sars) 1924	F 11308		,,
	11309–11	SAMus, Cape Flats	,,
Parastenocypris pectinata (Sars) 1924	F 11313–4	Transvaal	,,
	12112		,,
Parastenocypris smaragdina (Sars) 1924	F 11283–4		,,
	11285–8	Cape of Good Hope III	,,
**Stenocypris* sp.	F 11312	Cape of Good Hope I	,,
**Stenocypris* sp.	F 11316–7	Salt River	,,
**Stenocypris* sp.	F 11289	Port Elizabeth	,,
	11290	Cape of Good Hope	,,
	11291–2	Port Elizabeth	,,
**Stenocypris* sp.	F 11322	SAMus	,,
	11323	Cape of Good Hope III	,,

The asterisked entries indicate species, and in one instance a genus, with manuscript names. Some of these names are homonyms.

J. HANCOCK MUSEUM, NEWCASTLE-UPON-TYNE

Species	Locality	Det.
Physocypria armata (Müller) 1898	Pietermaritzburg, Natal	G.S.B.
? *Physocypria castanea* (Brady) 1904	Near Greytown, Natal	,,
	Near 'Rydal Mount', Witsieshoek, O.F.S.	,,
	Near prison, Port St. Johns, Pondoland	,,

Species	Locality	Det.
'*Cypridopsis*' *globuloides* (Brady) 1907	Richmond, Natal	G.S.B.
'*Cypridopsis*' *punctillata* (Brady) 1907	Pietermaritzburg, Natal	,,
Cyprilla reniformis (Brady) 1907	Somkele, NW of Mtubatuba, Zululand	,,
Oncocypris cf. *voeltzkowi* Müller 1898	Richmond, Natal	,,
	Pietermaritzburg, Natal	,,
Cypretta cf. *sarsi* Brady 1901	Pietermaritzburg, Natal	,,
Bradycypris intumescens (Brady) 1907	Somkele, NW of Mtubatuba, Zululand	,,
Paracypretta aratra (Brady) 1904	Near Greytown, Natal	,,
Tanycypris inermis (Brady) 1904	Near Greytown, Natal	,,
	Near 'Rydal Mount', Witsieshoek, O.F.S.	,,
Isocypris africana (Brady) 1913	1 524 m altitude, at Witsieshoek, O.F.S.	,,
Parastenocypris aldabrae (Müller) 1898	Pietermaritzburg, Natal	,,
	Near prison, Port St. Johns, Pondoland	,,
? *Parastenocypris perarmata* (Brady) 1904	Near Greytown, Natal	,,

K. THE MUSEUM, ZOOLOGICAL INSTITUTE, LUND

Species	Locality	Det.
Plesiocypridopsis insidiosa Rome 1965	Kaokoveld, Gauko-Otavi, South West Africa	R.R.
Homocypris longirostrata Rome 1965	Cape Flats, 1·6 km E of Zeekoevlei, Cape Province	,,
Tanycypris clavigera (Müller) 1898	Hensleys Dam, Basutoland	,,
Heterocypris calvus (Rome) 1965	Toeslaan, about 48 km N of Kakamas, Cape Province	,,
	Quthing, Basutoland	,,
Amphibolocypris exigua Rome 1965	Kruger National Park, Leeu Pan, 24 km NE of Skukuza, Transvaal	,,
Isocypris nivea Sars 1924	Toeslaan, about 48 km N of Kakamas, Cape Province	,,
Isocypris perangusta Müller 1908	Steenkamp Puts, 60 km NW of Upington	,,

Species	Locality	Det.
Apatelecypris brevis (Sars) 1924	Kaokoveld, Kowares, 145 km SE of Ohopoho, South West Africa	R.R.
	Kaokoveld, Anabib (Orupembe), about 161 km W of Ohopoho, South West Africa	,,
	Kaokoveld, Sanitatas, about 137 km WSW of Ohopoho, South West Africa	,,
Megalocypris durbani (Baird) 1862	Kaokoveld, Anabib (Orupembe), about 161 km W of Ohopoho, South West Africa	,,
Parastenocypris anisocantha (Rome) 1965	Albertinia, Cape Province	,,
Parastenocypris olivacea (Sars) 1924	Cape Flats, Vardenvlei, 3·2 km E of Ottery	,,
Parastenocypris pectinata (Sars) 1924	Kruger National Park, Leeu Pan, 24 km NE of Skukuza, Transvaal	,,

L. MUSEUM FÜR NATURKUNDE, HUMBOLDT-UNIVERSITÄT, BERLIN

Species	No.	Locality	Det.
'*Cypridopsis*' cf. *aculeata* (Costa) 1847	13143	Simonstown, Cape Province	G.W.M.
'*Cypridopsis*' *echinata* Müller 1908	13145 1300	Fish Hoek, near Simonstown	,,
'*Cypridopsis*' *triquetra* Müller 1908	13144 1712	Simonstown, Cape Province	,,
Zonocypris tuberosa Müller 1908	13159 1711	Plumstead, near Simonstown	,,
Bradycypris radiata (Müller) 1908	13160	Zeekoevlei, near Simonstown	,,
Paracypretta syngramma (Müller) 1908	13141 1704	Simonstown, Cape Province	,,
Cypricercus episphaena Müller 1908	13148 1700	Plumstead, near Simonstown	,,
Cypricercus maculatus Müller 1908	13147 1700	Plumstead, near Simonstown	,,
Eucypris capensis (Müller) 1908	13142 1702	Simonstown, Cape Province	,,
Eucypris corpulenta (Sars) 1896	13139 1703	Simonstown, Cape Province	,,

Species	No.	Locality	Det.
Eucypris trichota (Müller) 1908	13140 1705	Simonstown, Cape Province	G.W.M.
Eurycypris sp.	13157	Plumstead, near Simonstown	,,
Eurycypris sp.	13158 1706	Fish Hoek, near Simonstown	,,
Heterocypris capensis	13146 1709	Simonstown, Cape Province	,,
Candonocypris sp.	13149 1701	Cape Province	,,
Candonocypris sp.	13156	Cape Province	,,
Isocypris perangusta Müller 1908	13150 1707	Plumstead, near Simonstown	,,
Isocypris priomena Müller 1908	13151 1355 1708	Plumstead, near Simonstown	,,
Parastenocypris ametra typica (Müller) 1908	13154 1397	Lakeside, near Simonstown	,,
Parastenocypris ametra minor (Müller) 1908	13153 1398	Fish Hoek near Simonstown	,,

Dr. G. Hartwich (Vermes) writes that there is no material in the Deutsche Südpolar-Expedition collections from South Africa of species described as new by Müller in 1914, namely: *Cypris* (*Eurycypris*) *acuta* (=*Pseudocypris*); *Stenocypris bispinosa* (=*Parastenocypris*) and *Cytheridella capensis* (=*Gomphocythere*). He considers it possible, however, that these species are located in the museum's general collections of freshwater Ostracoda, but without the benefit of specialist knowledge cannot confirm this.

In this list, the four-figure numbers refer to items in the museum's slide collection.

M. TERMÉSZETTUDOMÁNYI MÚZEUM BUDAPEST

Species	Locality	Det.
Candonopsis nama Daday 1913	Besondermaid, Great Namaqualand	E.V.D.
Cypridopsis viduella Sars 1896	Chamis, Great Namaqualand	,,
	Kamaggas, Little Namaqualand	,,
	Steinkopf, south Kalahari	,,
	Riet-Tinkas, south Kalahari	,,
? *Hemicypris inversus* (Daday) 1913	Ku-Gudië, south Kalahari	,,
Heterocypris aurea (Sars) 1896	Kamaggas, Little Namaqualand	,,
	Steinkopf, south Kalahari	,,

Apatelecypris schultzei (Daday) 1913	Besondermaid, Great Namaqualand	E.V.D.

As yet I have received no advice from Dr. H. Farkas on whether or not these species are at Budapest among the Daday Collection. This list, therefore, is a tentative one.

N. THE GREAT BERG RIVER, WESTERN CAPE PROVINCE
(Harrison & Elsworth 1958, Harrison 1958)

Species	Localities
Cypricercus sp.	Hermon, road bridge
Cypria sp.	Hermon, road bridge
Pionocypris sp.	Hermon, road bridge; Piketberg, National Road bridge
Stenocypris sp.	Wellington, Lady Lock bridge
Cypretta sp.	Piketberg, National Road bridge
Cyprilla sp.	Piketberg, National Road bridge
Cypridopsis sp.	Piketberg, National Road bridge

Determinations by Dr A. D. Harrison. In the text, Dr H. W. Schäfer is listed as working on the Ostracoda material.

O. THE MAIN TUGELA RIVER (Oliff 1960)

Species	Localities
Eucypris sp. 1	No details listed
Isocypris sp. 1	,,
Isocypris priomena Müller	,,
Cypria capensis Sars	,,
Cyprilla arcuata Sars	,,
Cypretta minna (King)	,,
Zonocypris cordata ? Sars	,,
Zonocypris tuberosa ? Müller	,,
Ilyocypris australiensis Sars	,,
Herpetocypris chevreuxi (Sars)	,,
Typhalocypris sp. 1	,,
Cypridopsis gregaria (Sars)	,,
Cypridopsis glabrata Sars	,,
Cypridopsis hirsuta Sars	,,
Cypridopsis reniformis Sars	,,

Determinations by Dr A. D. Harrison. In the text, Dr H. W. Schäfer is listed listed under Ostracoda: (Identifications doubtful). I have changed spellings and added authors' names as necessary. The genus *Typhalocypris* is not known to me, it may be a misprint for *Typhlocypris* Vedjovsky.

P. ALKALINE AND ACID STILL WATERS, WESTERN CAPE PROVINCE (Harrison 1962)

Species	Localities
Stenocypris olivacea Sars	Zeekoevlei, northern and southern stations
Cypridopsis sp.	Zeekoevlei, southern station
Paracypretta sp. cf. *rubra* Sars	Vlei at Betty's Bay
Cypria sp. cf. *capensis* Sars	Vlei at Betty's Bay; Sirkelsvlei, near Cape Point
Gomphocythere sp.	Vlei at Betty's Bay; Sirkelsvlei, near Cape Point
Cypridopsis cf. *spinifera* Sars	Sirkelsvlei, near Cape Point
Stenocypris sp.	Vlei near Cecilia's Drift, Paarl
Eucypris sp.	Vlei near Cecilia's Drift, Paarl
Paracypretta sp.	Vlei near Cecilia's Drift, Paarl
Cypricercus sp. cf. *cuneatus* Sars	Vlei near Cecilia's Drift, Paarl
Cypridopsis sp.	Vlei near Cecilia's Drift, Paarl

Locality details from Tables 3, 4, 5, 7, 8, 9, 10, 11 (Harrison 1962: 238–44). Determinations by Dr A. D. Harrison.

Q. THE VAAL RIVER IN THE VEREENIGING AREA, HABITATS OTHER THAN MUDDY BOTTOM SEDIMENTS (Chutter 1963)

Species	Localities
Isocypris priomena Müller	Stations 10, 11, 13, 15
Stenocypris sp.	Stations 1, 2, 4a, 5, 7, 8, 9, 10, 13, 15
Cypridopsis sp.	Stations 1, 2, 4a, 5, 7, 8, 9, 9a, 10, 11, 12, 13, 15
Pionocypris sp.	Stations 1, 2, 4a, 7, 8, 9, 9a, 10, 12, 13, 15
? *Homocypris* sp.	Stations 1, 2, 4a, 8, 9a, 12, 15
? *Megalocypris* sp.	Station 12
Cyprilla sp.	Stations 13, 15
Gomphocythere sp.	Stations 1, 2, 4a, 5, 7, 9a, 10, 11, 15, 15a
Ilyocythere sp.	Stations 13, 15

Locality details are listed in Chutter (1963: 7). Determinations used are those given in the Appendix on p. 57 (Chutter, *op. cit.*) which differ in some instances from those in the Tables and text. Identifications by Dr F. M. Chutter.

R. THE VAAL RIVER IN THE VEREENIGING AREA, THE BOTTOM MUDS (Harrison, Keller & Lombard 1963)

Species	Localities
Isocypris sp.	Stations 1, 2, 3, 4a, 9, 9a, 10

Locality details are listed in Chutter (1963: 7). Determination by Dr A. D. Harrison.

S. MOUNTAIN STREAMS OF THE BARBERTON AREA, EASTERN TRANSVAAL (Hughes 1966)

Species	Locality
Isocypris sp.	Catalogue No. BTN 2 Y

Determination by Dr D. A. Hughes.

T. TRANSVAAL (Methuen 1911)

Species	Locality
Cypris spp.	Near Pretoria, Kimberley, Wakkerstroom, Eastern Province

Determination by Mr P. A. Methuen.

INSTRUCTIONS TO AUTHORS

Based on

CONFERENCE OF BIOLOGICAL EDITORS, COMMITTEE ON FORM AND STYLE. 1960.
Style manual for biological journals. Washington: American Institute of Biological Sciences.

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Examples (note capitalization and punctuation)

BULLOUGH, W. S. 1960. *Practical invertebrate anatomy.* 2nd ed. London: Macmillan.

FISCHER, P.-H. 1948. Données sur la résistance et de le vitalité des mollusques. *J. Conch., Paris* **88:** 100–140.

FISCHER, P.-H., DUVAL, M. & RAFFY, A. 1933. Etudes sur les échanges respiratoires des littorines. *Archs Zool. exp. gén.* **74:** 627–634.

KOHN, A. J. 1960*a*. Ecological notes on *Conus* (Mollusca: Gastropoda) in the Trincomalee region of Ceylon. *Ann. Mag. nat. Hist.* (13) **2:** 309–320.

KOHN, A. J. 1960*b*. Spawning behaviour, egg masses and larval development in *Conus* from the Indian Ocean. *Bull. Bingham oceanogr. Coll.* **17** (4): 1–51.

THIELE, J. 1910. Mollusca: B. Polyplacophora, Gastropoda marina, Bivalvia. *In* SCHULTZE, L. *Zoologische und anthropologische Ergebnisse einer Forschungsreise im westlichen und zentralen Süd-Afrika.* **4:** 269–270. Jena: Fischer. *Denkschr. med-naturw. Ges. Jena* **16:** 269–270.

ZOOLOGICAL NOMENCLATURE

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Example

Scalaria coronata Lamarck, 1816: pl. 451, figs 5 *a*, *b*; Liste: 11. Turton, 1932: 80.

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ANNALS OF THE SOUTH AFRICAN MUSEUM
ANNALE VAN DIE SUID-AFRIKAANSE MUSEUM

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THE FAMILY SERGESTIDAE IN THE WATERS AROUND SOUTHERN AFRICA (CRUSTACEA, DECAPODA, NATANTIA)

By

BRIAN F. KENSLEY

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By

Brian F. Kensley

South African Museum, Cape Town

(With 24 figures)

[*MS. accepted* 20 *January* 1971]

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Introduction

The family Sergestidae is represented in the waters around southern Africa by three genera of the subfamily Sergestinae, viz. *Sergestes*, *Petalidium* and *Acetes*, and by one genus viz. *Lucifer* in the subfamily Luciferinae. Literature concerning these southern African representatives is very poor. Regarding the genus *Sergestes*, both Hansen (1925) and Barnard (1950) reported on five species. The distribution of these five species was touched on briefly by Grindley & Penrith (1965), while Kensley (1968) added four species to the South African list. Barnard (1950) dealt with *Acetes erythraeus* and in 1955 described another species of the same genus, while in his former paper he discussed one species of *Lucifer*.

In this present paper almost all the available material has been examined. This material comes from several sources. The material collected at the start of this century by the S.S. *Pieter Faure* has been examined. The whereabouts of the material collected by the S.S. *Pickle* in the 1920s are unknown. A fair number of specimens were obtained in 1959 when the Division of Sea Fisheries research ship *Africana II* did a series of deep trawls off Cape Point. All this material is housed in the South African Museum. From 1960 to 1963 the South African Museum undertook a survey of the bathypelagic fauna around South Africa using the S.A.S. *Natal*. A preliminary report of this survey was published by Grindley & Penrith (1965). Again, this material is housed in the South African Museum. The Division of Sea Fisheries has made extensive collections from 1961 to 1966, from off Moçambique and southern Malagasy on the east, to the Walvis Basin on the west. This large collection has also been examined.

Ann. S. Afr. Mus. **57** (10), 1971: 215–264, 24 figs.

The Oceanography Department of the University of Cape Town has over the years 1958–65 made extensive plankton collections off the southern African coasts. All the specimens of *Lucifer* in these collections, which include those of the National Geophysical Year collected by the S.A.S. *Natal* in 1958, the International Indian Ocean Expedition, also collected by the S.A.S. *Natal* in 1962 and 1963, and those of the *John D. Gilchrist* collections have been examined.

The data for the stations given in the discussions of the individual species may be obtained from the various sources listed below.

1. Stations designated by 'A' followed by three digits e.g. A321, denote '*Africana*' stations off Cape Point. Data obtainable from Kensley (1968).
2. Stations designated by 'A' followed by four digits e.g. A1231, denote '*Africana*' Stations. A1138–A1148 are obtainable from the *Annual Report* of the Director of the Division of Sea Fisheries for the year April, 1960–March, 1961. A1224–A4229, carried out between 1961 and 1966 are as yet unpublished.
3. Stations GIL 54–85 (*John D. Gilchrist*) are obtainable from the *Publication* No. 7 of the Oceanography Department of the University of Cape Town. Stations GIL 254–566 are obtainable from *Data Report* No. 3 of the Oceanography Department of the University of Cape Town.
4. Stations designated NGY (National Geophysical Year) are obtainable from *Publication* No. 1 of the Oceanography Department of the University of Cape Town.
5. Stations designated by NIOE (National Indian Ocean Expedition) stations 1–178 are obtainable from *Data Report* No. 2 of the Institute of Oceanography of the University of Cape Town.
   Stations NIOE 200–215 are obtainable from *Data Report* No. 3 of the Institute of Oceanography of the University of Cape Town.
6. Stations designated IK denote South African Museum Isaacs-Kidd bathypelagic survey. Station data are obtainable from Grindley & Penrith (1965).

Abbreviations used in figures

la—lobus armatus
l.ac—lobus accessorius
lc—lobus connectens
li—lobus inermis
lt—lobus terminalis
pu—processus uncifer
pv—processus ventralis

Fairly full descriptions have been given in four cases, all of which are species erected by Burkenroad in 1940. All four species were described from *Dana* Expedition material, and only preliminary descriptions have so far been published. Comparison of the present material with the *Dana* type material sent on loan through the kind offices of Dr. Torben Wolff of Copenhagen, and Dr. A. A. Racek of Sydney has confirmed the identifications.

Finally, in all cases where the carapace length of a specimen is given, this has been measured from the base of the rostrum (i.e. at base of eyestalk) to the mid-dorsal point of the posterior carapace margin.

List of Species

Subfamily **Luciferinae**

- *Lucifer chacei* Bowman
- *Lucifer orientalis* Hansen
- *Lucifer penicillifer* Hansen
- *Lucifer typus* H. Milne Edwards

Subfamily **Sergestinae**

- *Acetes erythraeus* Nobili
- *Acetes natalensis* Barnard
- *Sergestes* (*Sergestes*) *arcticus* Kröyer
- *Sergestes* (*Sergestes*) *armatus* Kröyer
- *Sergestes* (*Sergestes*) *atlanticus* H. Milne Edwards
- *Sergestes* (*Sergestes*) *corniculum* Kröyer
- *Sergestes* (*Sergestes*) *disjunctus* Burkenroad
- *Sergestes* (*Sergestes*) *orientalis* Hansen
- *Sergestes* (*Sergestes*) *pectinatus* Sund
- *Sergestes* (*Sergestes*) *sargassi* Ortmann
- *Sergestes* (*Sergia*) *creber* Burkenroad
- *Sergestes* (*Sergia*) *grandis* Sund
- *Sergestes* (*Sergia*) *laminatus* Burkenroad
- *Sergestes* (*Sergia*) *prehensilis* Bate
- *Sergestes* (*Sergia*) *potens* Burkenroad
- *Sergestes* (*Sergia*) *regalis* Gordon
- *Sergestes* (*Sergia*) *scintillans* Burkenroad
- *Sergestes* (*Sergia*) *splendens* Sund
- *Petalidium foliaceum* Bate

Key to genera and subgenera

1.	Body strongly compressed, lacking gills, planktonic	*Lucifer*
—.	Body not strongly compressed, gills present	2
2.	Last two pairs pereiopods absent	*Acetes*
—.	Last two pairs pereiopods present	3
3.	Gills present above fourth pereiopods	4 (*Sergestes*)
—.	Gills absent or rudimentary above fourth pereiopods	*Petalidium*
4.	No dermal photophores present. Organs of Pesta present (luminescent modifications of gastro-hepatic gland)	*Sergestes* (*Sergestes*)
—.	Dermal photophores often present. Organs of Pesta absent	*Sergestes* (*Sergia*)

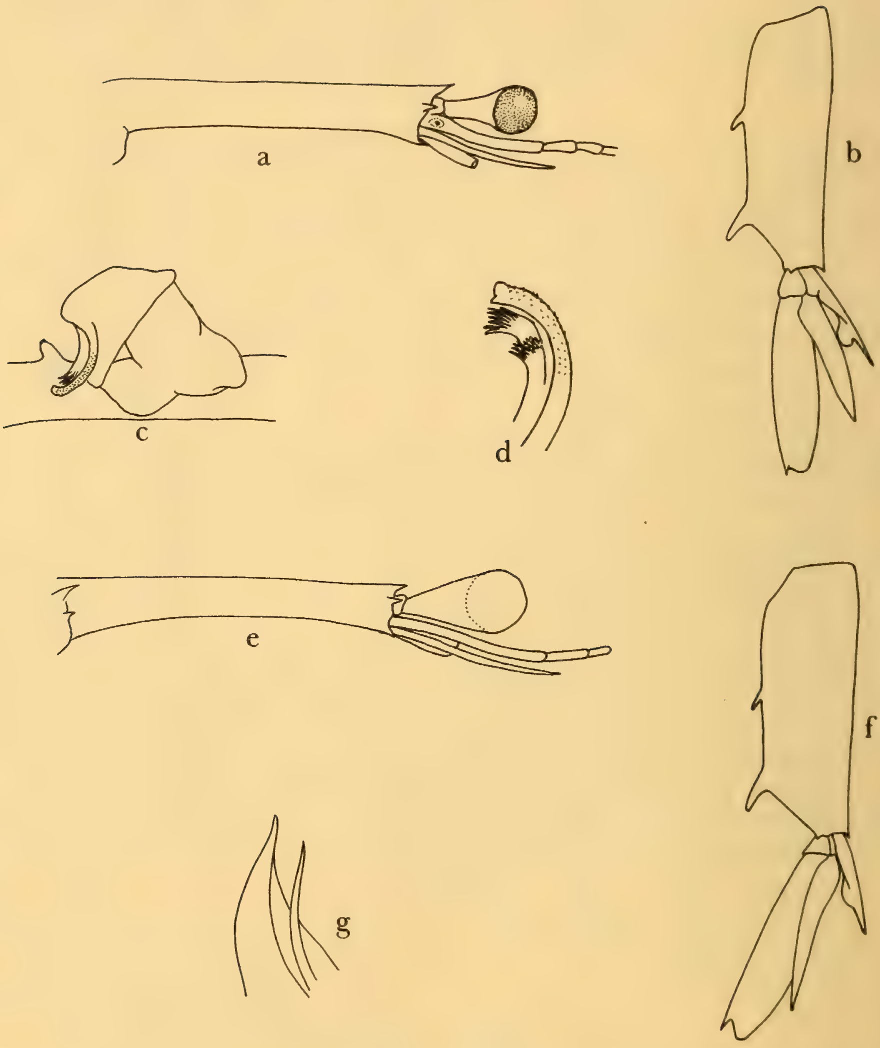

FIG. 1. *Lucifer penicillifer*
a. Anterior region; *b*. Male, 6th abdominal segment, telson and uropod;
c. Petasma, *in situ*; *d*. Apex of petasma.

Lucifer chacei
e. Anterior region; *f*. Male, 6th abdominal segment, telson, and uropod; *g*. Apex of petasma.

Description of material

Subfamily **Luciferinae**

Genus LUCIFER

Pelagic forms, rostrum short, spiniform. Carapace strongly compressed. Region between bases of eyes and antennae, and mouthparts elongate. Antennule lacking lower flagellum in both sexes. Third maxilliped and first three pereiopods slender, elongate, first and second pereiopods non-chelate, third pereiopods imperfectly chelate. Fourth and fifth pereiopods lacking. Gills entirely absent. Sixth abdominal segment in male with two ventral processes, unarmed in female. Telson in male with ventral process, female lacking process. Single genital opening in both sexes.

Key to known southern African species

1. Eyestalk less than half distance between bases of eyes and labrum . . . 2
—. Eyestalk more than half distance between bases of eyes and labrum . . 3
2. Petasma terminally expanded, processus ventralis brush-like. . . *penicillifer*
—. Petasma terminally acute, with needle-like processus ventralis . . . *chacei*
3. Telson in male with ventral process some distance from apex.
    Petasma with processus ventralis having transverse area between two horns *typus*
—. Telson in male with ventral process ending at apex.
    Petasma with processus ventralis lacking transverse area between two horns . . . . *orientalis*

Lucifer chacei Bowman, 1967
Fig. 1e–g

Lucifer chacei Bowman, 1967: 266, figs 1, 2*a–b*, 3*a–c*, 4.

Lucifer faxoni (*non* Borradaile) Hansen, 1919: 61, pl. 5, figs 3*a–i*. Chace, 1955: 4.

Description: Eye plus eyestalk about two fifths length of distance between eyestalk base and labrum. Basal antennular segment reaching to end of cornea in female, somewhat beyond cornea in male. Sixth abdominal segment in male with short straight anterior process, posterior process slender, curved. Spine on outer margin of outer uropod ramus reaching to apex of appendage in female, not quite reaching apex in male. Process on anterior margin of first pleopod in male longer than broad. Petasma with terminal portion curved, apically acute, processus ventralis slender, needle-like.

Distribution: East Indies, Pacific.

South African stations: A1231, A1232.

Material: 4 ♀♀, 1 ♂.

Lucifer orientalis Hansen, 1919
Fig. 2e–g

Lucifer orientalis Hansen, 1919: 55, pl. 4, fig. 7. Gordon, 1956: 325.

Description: Eye plus eyestalk slightly shorter than distance between eyestalk base and labrum. First antennular peduncle segment reaching to edge of

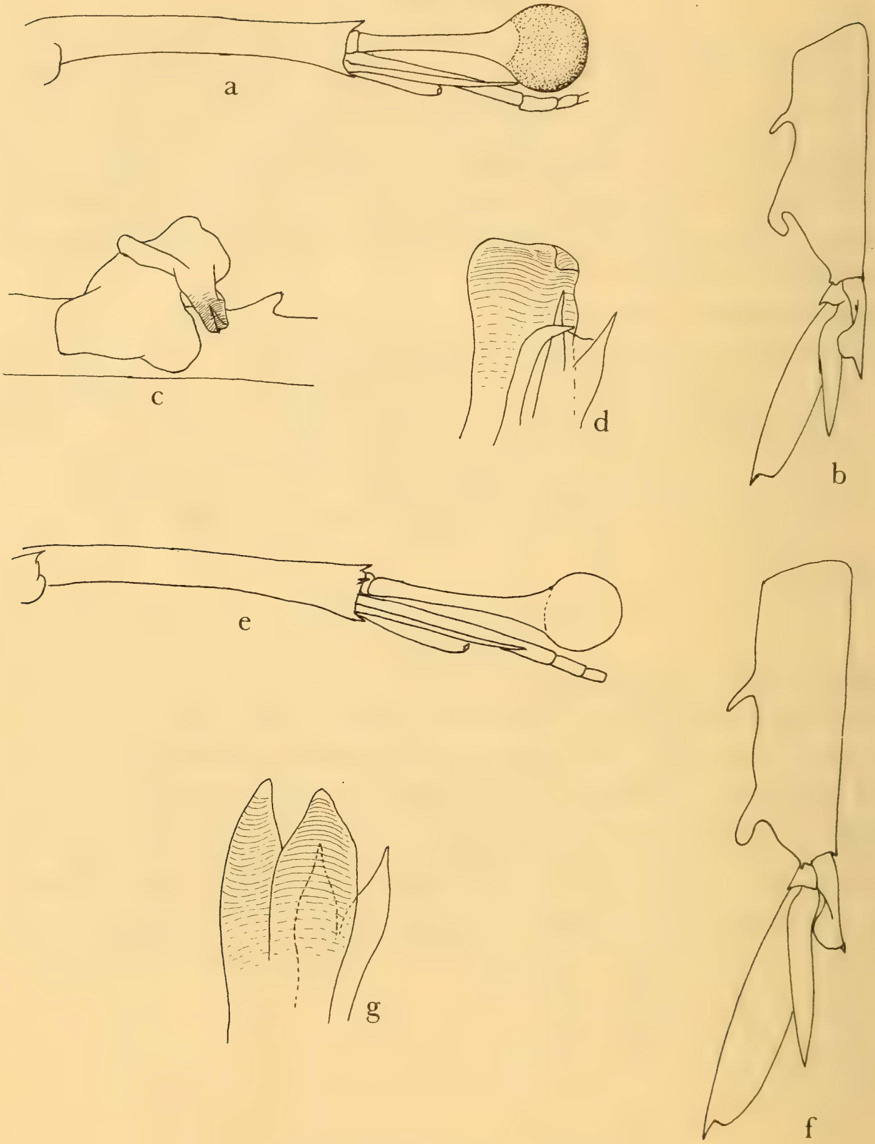

FIG. 2. *Lucifer typus*

a. Anterior region; *b.* Male, 6th abdominal segment, telson and uropod; *c.* Petasma *in situ*; *d.* Apex of petasma.

Lucifer orientalis

e. Anterior region; *f.* Male, 6th abdominal segment, telson and uropod; *g.* Apex of petasma.

cornea. Sixth abdominal segment in male with anterior process curved, apically acute. Posterior process distally expanded, slightly flexed. Telson in male short, rounded ventral process ending distally at apex. Spine on outer margin of outer uropod ramus extending well beyond apex. Petasma with sheath consisting distally of two pointed lobes, with transverse lines on outer surface, covering the processus ventralis. Latter consisting of two diverging pointed lobes.

Distribution: East Indies, off Philippines, Red Sea.

South African stations: A1239, GIL144, GIL239, NGY3, NGY4, NGY6, NGY7, NGY10, NGY12, NGY15, NGY16, NGY19, NGY21, NGY24, NGY27, NGY46, NGY50.

Remarks: Hansen (1919) remarks that the females of the closely related species *L. typus* and *L. orientalis* are very difficult to distinguish; this is certainly the case in the present material; consequently where the two species have occurred in the same sample, only the males of *L. orientalis* have been separated.

Lucifer penicillifer Hansen, 1919

Fig. 1a–d

Lucifer penicillifer Hansen, 1919: 59, pl. 5, fig. 2. Barnard, 1947: 384; 1950: 645, fig. 121. Gordon, 1956: 32, figs 4–6.

Lucifer typus (*non* Milne Edwards) Stebbing, 1914*a*: 28.

Description: Length of eye about one third that of distance between base of eyestalk and labrum. First antennular peduncle segment extending slightly beyond eye. Sixth abdominal segment in male with two ventral processes, the posterior one the larger, the apex acutely rounded. Telson in male with the rounded ventral process some distance from the apex, bearing numerous tiny granules. Tooth on outer margin of outer uropod ramus not extending beyond apex. Petasma with strongly chitonized sheath, the outer convex portion of which bears numerous tiny spines, the apex slightly expanded. Processus ventralis slender ending in a bipartite 'brush'.

Distribution: East Indies, Bay of Bengal, China Sea, off Great Barrier Reef.

South African locality: Mossel Bay.

South African stations:

'*Africana*'	GIL	NGY		NIOE
A1225	54	2	50	1
A1226	60	3	59	2
A1227	63	7	71	35
A1228	64	8	73	58
A1231	65	9	75	73
A1232	67	11	77	74
A1897	76	12	78	75

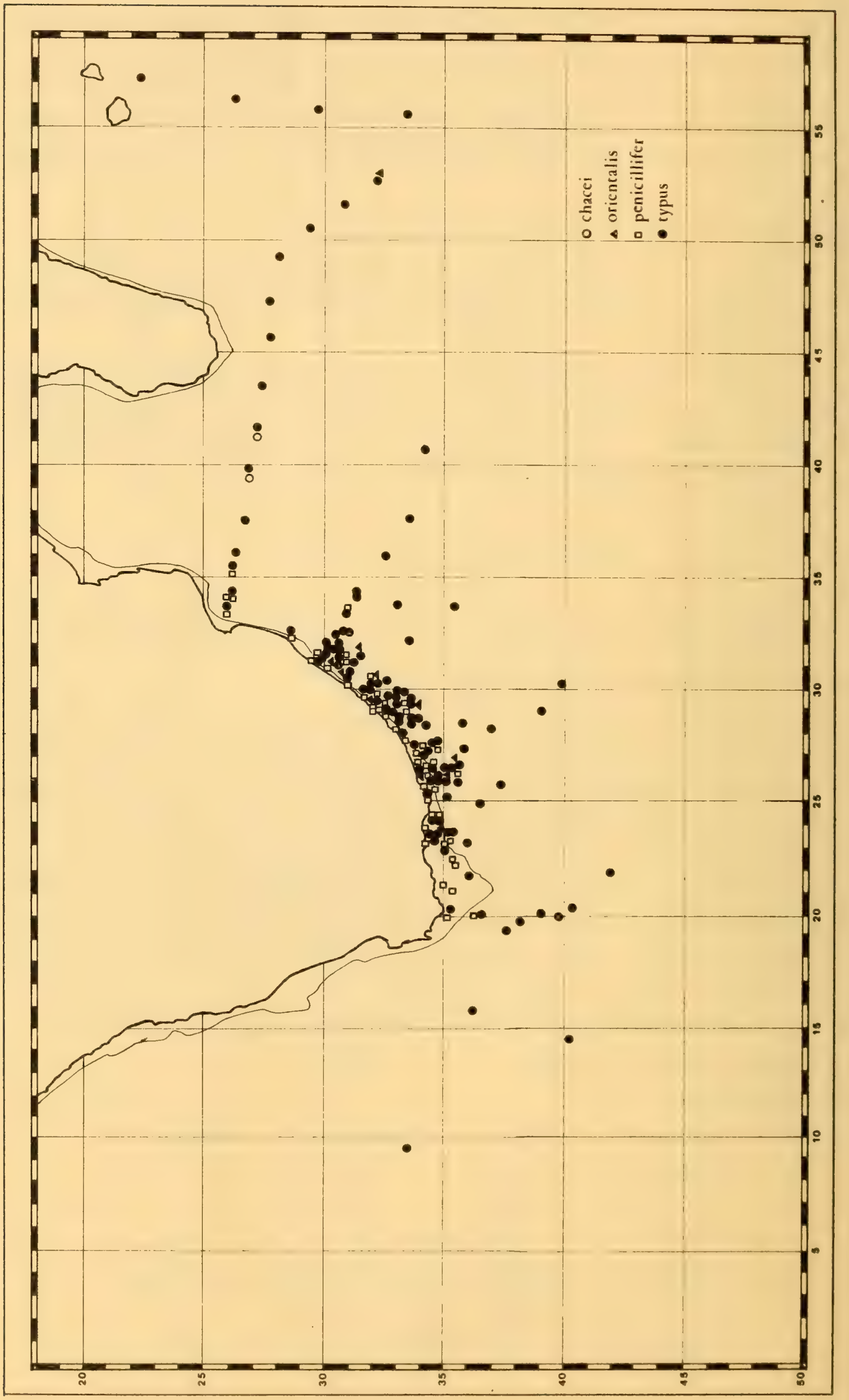

Fig. 3. Map showing distribution of the genus *Lucifer* around southern Africa

'Africana'	GIL	NGY		NIOE
A2386	77	16	79	77
	83	17	81	85
	86	19	83	92
	87	25	89	93
	88	26	90	95
	143	29		114
	169	30		159
	330	34		161
	254	37		176
	281	38		177
		41		200
		47		201
		48		205
		49		210

Remarks: L. penicillifer is the only species hitherto recorded from South African waters. It was collected by the *Pieter Faure* from Mossel Bay.

Lucifer typus H. Milne Edwards, 1837

Fig. 2a–d

Lucifer typus H. Milne Edwards, 1837: 469. Hansen, 1919: 53, pl. 4, fig. 6. Gordon, 1956: 324, figs 1–3. Bowman & McCain, 1967: 660, fig. 1*a–b*.

Description: Length of eye plus eyestalk less than the distance between eyestalk base and labrum. First antennular peduncle segment reaching to edge of cornea. Sixth abdominal segment in male with anterior process slender, acute. Posterior process distally expanded and bent. Ventral rounded process of telson in male some distance from apex. Spine on outer margin of outer uropod ramus extending well beyond apex. Petasma with terminal portion robust, sheath apically blunt. Sheath with transverse lines on outer surface, enclosing the broad processus ventralis and a strong hooked process. Processus ventralis with two terminal spines separated by a straight edge.

Distribution: Off Atlantic coast of North America, Sargassum Sea, East Indies, Bay of Bengal, Philippines, off Great Barrier Reef.

South African stations:

'Africana'	GIL	NGY		NIOE
A1225	54	1	60	2
A1227	60	2	62	3
A1228	61	3	65	4
A1229	64	4	68	5
A1230	65	5	69	7
A1231	77	6	70	12
A1232	85	7	72	21

'*Africana*'	GIL	NGY		NIOE
A1233	86	8	75	34
A1234	87	9	74	35
A1235	121	10	76	59
A1236	144	11	77	60
A1237	184	12	79	61
A1238	183	13	80	62
A1239	206	14	81	74
A1241	254	15	83	80
A1242	285	16	85	90
A1243	286	17	86	97
A1244		18	87	98
A1252		19	89	114
A1253		20	90	128
A1254		21		142
A1896		22		143
A1897		23		145
A2386		24		155
A2387		25		156
A2389		26		157
A2390		27		158
A2391		28		159
A2961		29		164
A2966		30		170
A3633		31		173
A3634		32		175
A3645		34		177
		35		200
		36		201
		37		204
		38		205
		39		206
		40		207
		41		210
		42		215
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		50		
		59		

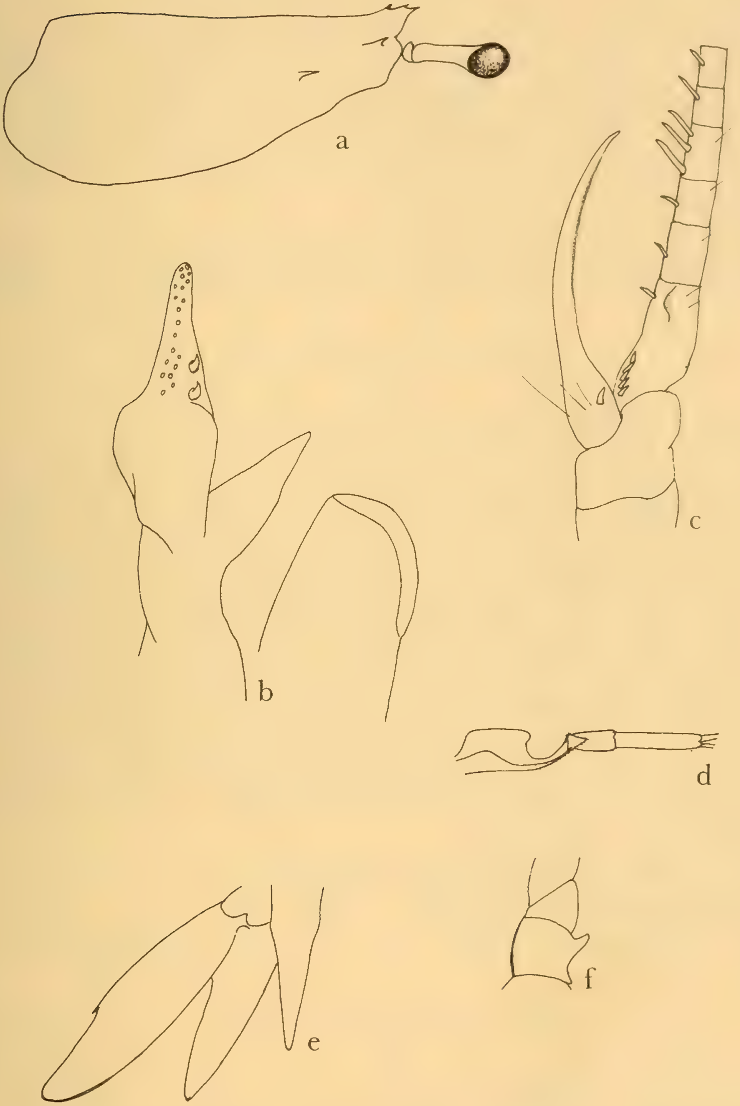

Fig. 4. *Acetes erythraeus*
a. Carapace in lateral view; *b*. Petasma; *c*. Male, outer antennular flagellum;
d. Antennular peduncle in lateral view; *e*. Telson and uropod in dorsal view;
f. Female, coxa pereiopod three.

Subfamily **Sergestinae**

Genus ACETES

Rostrum short, with one or more dorsal denticles, strong supraorbital and hepatic spines present. Third antennular peduncle segment in female slightly longer than second joint, very much longer in male. Lower antennular flagellum in male with clasping organ. Third maxilliped slender, elongate, shorter than third pereiopod. Two distal joints of pereiopod undivided. First pereiopod with small chela. Pereiopods four and five entirely lacking. Petasma lacking the numerous ramifications found in *Sergestes*.

Key to the known southern African species

1. Telson apically acute, reaching beyond midpoint of inner uropod ramus . . *erythraeus*
—. Telson apically truncate, not reaching midpoint of inner uropod ramus . . *natalensis*

Acetes erythraeus Nobili, 1905

Fig. 4

Acetes erythraeus Nobili, 1905: 394, fig. 1; 1906: 23, pl. 1, fig. 5. Kemp, 1917: 51, figs *1c–e*, *2b*, *3b*, *4b*, *5a*, *d*, *7b*. Barnard, 1950: 822; 1955: 42.

Description: Rostrum slightly elevated, apically acute, with two dorsal denticles. Strong supraorbital and hepatic spines present. Antennular peduncle with basal segment equal to third segment, latter twice length of second. Scaphocerite reaching to slightly beyond midpoint of third peduncle segment. Eye reaching almost to end of basal peduncle segment, much wider than eyestalk. Pereiopods slender, coxa periopod three in female with distal and proximal process on inner face. Curved median forwardly directed spine between bases of first pleopods. Telson apically acute, reaching beyond middle of inner uropod ramus. Outer ramus with spine on outer margin. Petasma male with triangular apically acute processus ventralis. Capitulum proximally broad, distally more slender. Latter portion bears several small hooks, plus two large curved hooks at its base.

Distribution: Coast of Thailand, Coast of India, Red Sea.

Southern African localities: Delagoa Bay, Durban.

Material: 9 ♀♀, carapace length 6·2–9·0 mm; 5 ♂♂, carapace length 5·8–7·4 mm.

Acetes natalensis Barnard, 1955

Fig. 5

Acetes natalensis Barnard, 1955: 43.

Description: Rostrum slightly elevated, apically acute, with two dorsal denticles. Strong supraorbital and hepatic spines present. Antennular peduncle in male with basal segment shorter than third, latter almost three times length of middle segment. Scaphocerite reaching to end of middle segment. In female, scaphocerite reaches to middle of third segment, latter shorter than basal segment. Eye not quite reaching end of basal segment, wider than eyestalk. Pereiopods slender, coxa pereiopod three in female with blunt proximal process on median

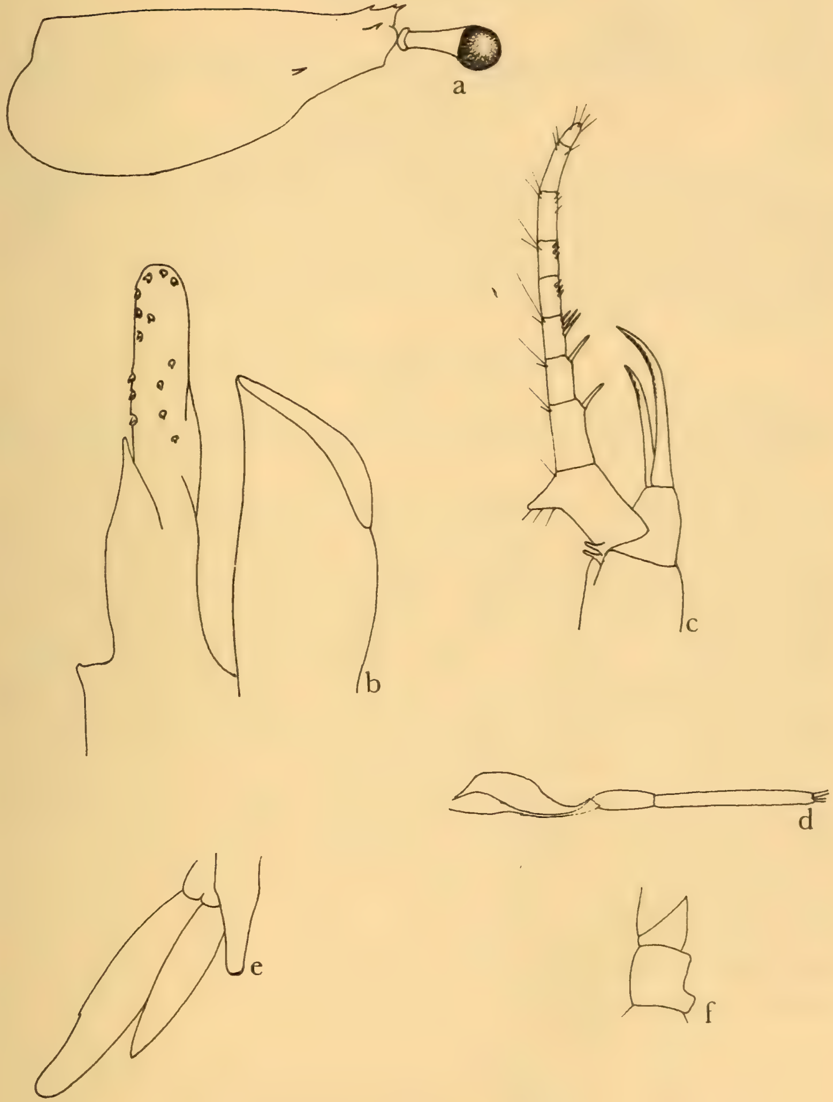

Fig. 5. *Acetes natalensis*
a. Carapace in lateral view; *b*. Petasma; *c*. Male outer antennular flagellum; *d*. Antennular peduncle in lateral view; *e*. Telson and uropod in dorsal view; *f*. Female coxa pereiopod three.

face, no distal process. No spine present between bases of first pleopods. Telson apically truncate not reaching middle of inner uropod ramus. Petasma male with elongate cylindrical capitulum bearing several small hooks, and at its base on the inner side, a short triangular process.

Locality: Durban Bay.

Material: 5 ♀♀, carapace length 3·9–5·3 mm; 3 ♂♂, carapace length 5·6–5·9 mm.

Genus PETALIDIUM

Shrimp-like forms with first three pairs of pereiopods elongate, second and third bearing a tiny chela. Pereiopods four and five reduced, fourth longer than fifth. Pleurobranchs and pleurobranchial lamellae present above third maxilliped and first three pereiopods, gill absent or rudimentary above fourth pereiopod. Processus ventralis of petasma in male bifurcate.

Petalidium foliaceum Bate, 1881

Fig. 6

Petalidium foliaceum Bate, 1881: 194; 188: 349, pl. 60. Hansen, 1896: 936; 1903: 54, pl. 11, fig. 1. Illig, 1914: 372, figs 31–34. Stebbing, 1914*b*: 284, pl. 28. Burkenroad, 1937: 326. Hale, 1941: 261, figs 1, 2.

Description: Rostrum short, slightly elevated, somewhat variable, with single forwardly directed tooth, sometimes with posterior tooth. Cervical groove prominent, antennal and suprabranchial ridges strong. Minute hepatic spine present. Eyestalk with two median tubercles. Third maxilliped and all pereiopods missing in all specimens. Telson apically acute, with two subapical spines and four plumed setae. Outer uropod ramus with minute tooth near apex. Petasma in male slender, elongate. Processus uncifer with strong subapical spine, apex acute. Processus ventralis slender, distally divided into long ramus armed with hooks, and short apically hooked ramus. Lobus terminalis bilobed, with long slender ramus, apically armed with hooks, and short slender ramus. Lobus inermis just below lower lobus terminalis lobe, short, blunt. Lobus armatus consisting of two blunt lobes armed with a few hooks.

Distribution: Most of the southern seas, i.e. South Atlantic, southern Indian Ocean, south of Australia, Antarctic.

South African stations: A1879, A2945, A2958, A2963, A3616, A3643.

Material: Carapace length (mm)

♂	♀
8·0	6·0
9·3	6·5
9·7	8·1
9·9	9·5
10·6	11·8
11·0	12·8

Remarks: Although this species has been recorded from the south Atlantic, this

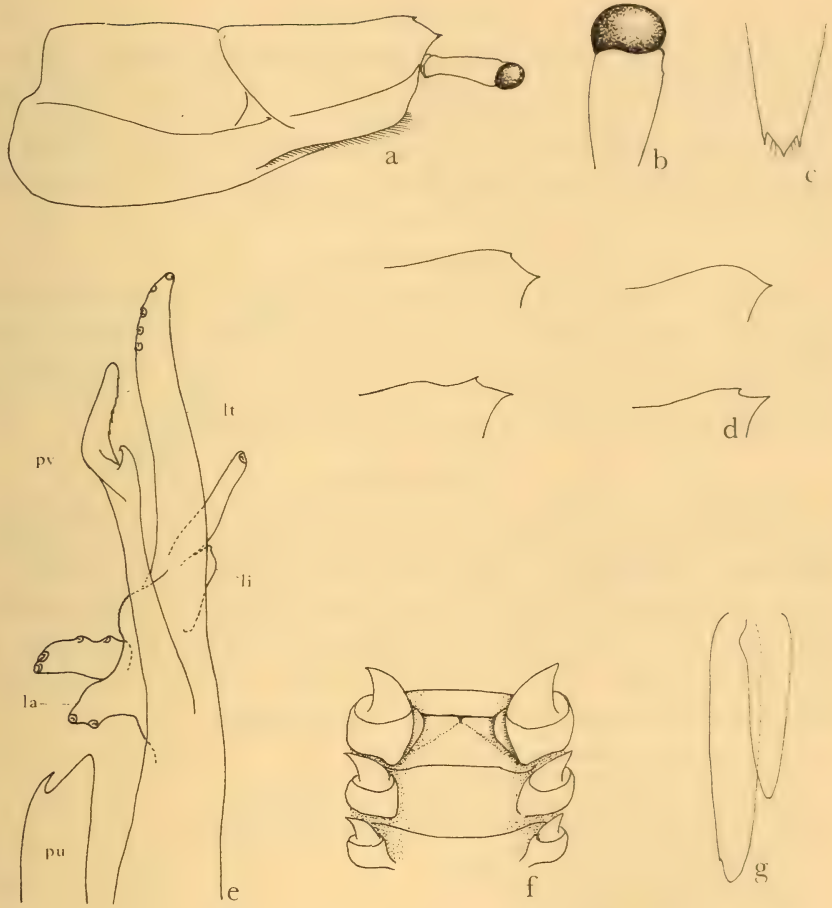

FIG. 6. *Petalidium foliaceum*
a. Carapace in lateral view; *b*. Eyestalk; *c*. Telsonic apex; *d*. Rostral variation; *e*. Petasma; *f*. Thelycum; *g*. Uropod rami.

is the first record from the South African region. Unfortunately, because of the very soft nature of the exoskeleton, several of the specimens are damaged, while none have retained the third maxillipeds or the pereiopods.

Genus SERGESTES

Shrimp-like forms with first three pairs of pereiopods elongate, the second and third bearing a tiny chela. Pereiopods four and five lacking dactyls, reduced, often flattened, bearing natatory setae, fifth usually shorter than fourth. First maxilla bearing palp, second maxilla bearing two lobes. First maxilliped bearing segmented palp. Branchial lamellae as well as arthrobranchs present. Processus ventralis of petasma in male not forked.

Subgenus SERGESTES

'Species of *Sergestes* s.l. with specialized luminescent modifications of the gastrohepatic gland (organs of Pesta) but without dermal photophores. Supraorbital and hepatic spines maybe present or absent in adult. Ovary confined to cephalothorax. Colour in life due to red subcuticular chromatophores mainly concentrated on the anterior part of the body' (Yaldwyn, 1957).

Subgenus SERGIA

'Species of *Sergestes* s.l. without specialized luminescent modifications of the gastrohepatic gland (organs of Pesta). With or without dermal photophores which when present may or may not have cuticular lenses. Supraorbital and hepatic spines absent in adult (secondary hepatic prominences may sometimes be present). Ovary may extend into abdomen. Adult with red cuticular pigment distributed over entire body and appendages in life' (Yaldwyn, 1957).

Key to known southern African species of the subgenus Sergestes

1.	Third maxillipeds subequal to third pereiopods	2
—.	Third maxillipeds longer than third pereiopods	5
2.	Two distal segments of pereiopod five setose on both margins	3
—.	Two distal segments of pereiopod five setose on only one margin	4
3.	Supraorbital spine present. Lobus armatus of petasma straight	*disjunctus*
—.	Supraorbital spine absent. Lobus armatus of petasma strongly curved	*corniculum*
4.	Third segment of antennular peduncle equal to or longer than first. Petasma lobes short, stumpy	*atlanticus*
—.	Third segment of antennular peduncle shorter than first. Petasma lobes elongate	*arcticus*
5.	Two distal segments of pereiopod five setose on both margins	6
—.	Two distal segments of pereiopod five setose on only one margin	7
6.	Dactylus and distal half of propodus of third maxilliped with numerous spines forming comb-like structure. Processus ventralis of petasma unarmed	*pectinatus*
—.	Dactylus and distal half of propodus of third maxilliped armed with spines but not forming comb-like structure. Processus ventralis of petasma armed distally with numerous spines	*sargassi*
7.	Dactylus of third maxilliped consisting of four segments	*armatus*
—.	Dactylus of third maxilliped consisting of six segments	*orientalis*

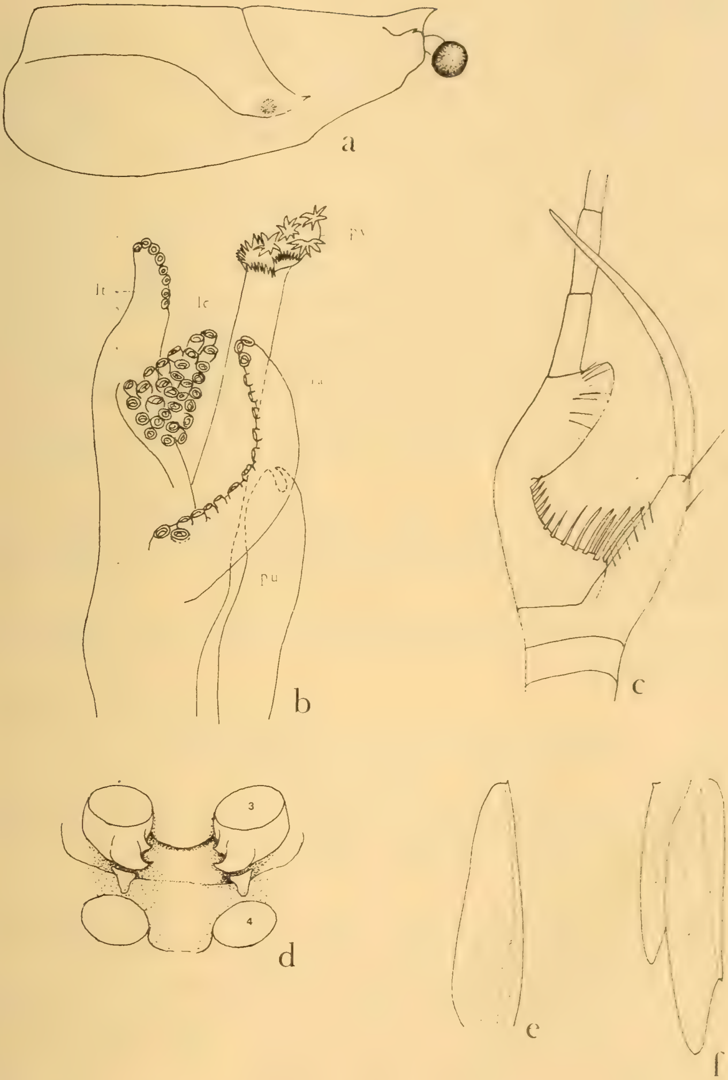

FIG. 7. *Sergestes* (*Sergestes*) *arcticus*
a. Carapace in lateral view; *b*. Petasma; *c*. Male, outer antennular flagellum; *d*. Female, coxae pereipods three; *e*. Scaphocerite; *f*. Uropod.

Sergestes (*Sergestes*) *arcticus* Kröyer, 1859

Fig. 7

Sergestes arcticus Kröyer, 1859: 240. Smith, 1886, pl. 20, figs 1, 2. Ortmann, 1893: 33. Kemp, 1910: 30, pl. 3, figs 13–19. Sund, 1920: 8, fig. 5. Hansen, 1922: 62, pl. 1, figs 1, 2, pl. 3, fig. 3; 1925: 23. Illig, 1914: 355; 1927: 306, figs 53–65. Barnard, 1950: 639, fig. 120, *a–d*. Holthuis, 1952: 8, fig. 1. Grindley & Penrith, 1965: 280.

Sergestes (*Sergestes*) *arcticus* Yaldwyn, 1957: 9, figs 1–5.

Description: Rostrum short, horizontal, apically acute. Strong supraorbital spine and ridge present. Cervical groove distinct, with hepatic spine at its base, suprabranchial ridge distinct. Eyes laterally directed, no ocular tubercle. Scaphocerite with apical spine on outer margin. Two distal antennular peduncle segments equal in length to basal segment. Maxilliped three slender, not longer than pereiopods. Coxa pereiopod three in female with broad incurved hook, sternum bearing rounded flap-like operculum. Fifth pereiopod slightly more than half length of fourth, two distal segments setose on only one margin. Telson apically acutely rounded, outer uropod ramus with spine at about distal third. Petasma in male with elongate curved lobus armatus, armed with row of hooks on inner margin, lobus connectens triangular, covered with large hooks, lobus terminalis with few distal hooks, processus ventralis distally expanded, armed with several clustered spine-like hooks.

Distribution: North and South Atlantic, off Chile, off New Zealand, South Australia.

South African stations: IK40, IK50, IK51, PF2380, PF16832, A1877, A1879, A1889, A2391, A2393, A2394, A2950, A2953, A2958, A2961, A2962, A2963, A2966, A3643, A3634, A2968.

Material: Average carapace length for 24 ♂♂: 9·5 mm. Average carapace length for 40 ♀♀: 12·7 mm.

Sergestes (*Sergestes*) *armatus* Kröyer, 1855

Fig. 8

Sergestes armatus Kröyer, 1855: 10. Ortmann, 1893: 36. Hansen, 1896: 966; 1903: 63; 1922: 174, pl. 10, figs 6*a–k*; 1925: 26. Sund, 1920: 23, figs 39–41. Burkenroad, 1937: 321. Barnard, 1950: 643, figs 120, *m–p*. Grindley & Penrith, 1965: 281.

Sergestes (*Sergestes*) *armatus:* Yaldwyn, 1957: 8. Kensley, 1968: 304.

Description: Rostrum somewhat elongate, apically acute with trace of dorsal denticle. Small supraorbital and hepatic spines present. Suprabranchial ridge present, cervical groove weakly defined. Eyestalk bearing ocular tubercle medio-distally, reaching to middle of basal antennular peduncle segment. Latter two-thirds length of third peduncle segment. Median segment shorter than basal. Scaphocerite apically pointed without spine on outer margin, reaching at least to midpoint of third antennular peduncle segment. Maxilliped three longer and stouter than pereiopods, dactylus consisting of four segments bearing about 15 long and short spines. Two proximal segments equal in length, longer than two distal segments, penultimate segment shortest. Fifth pereiopods

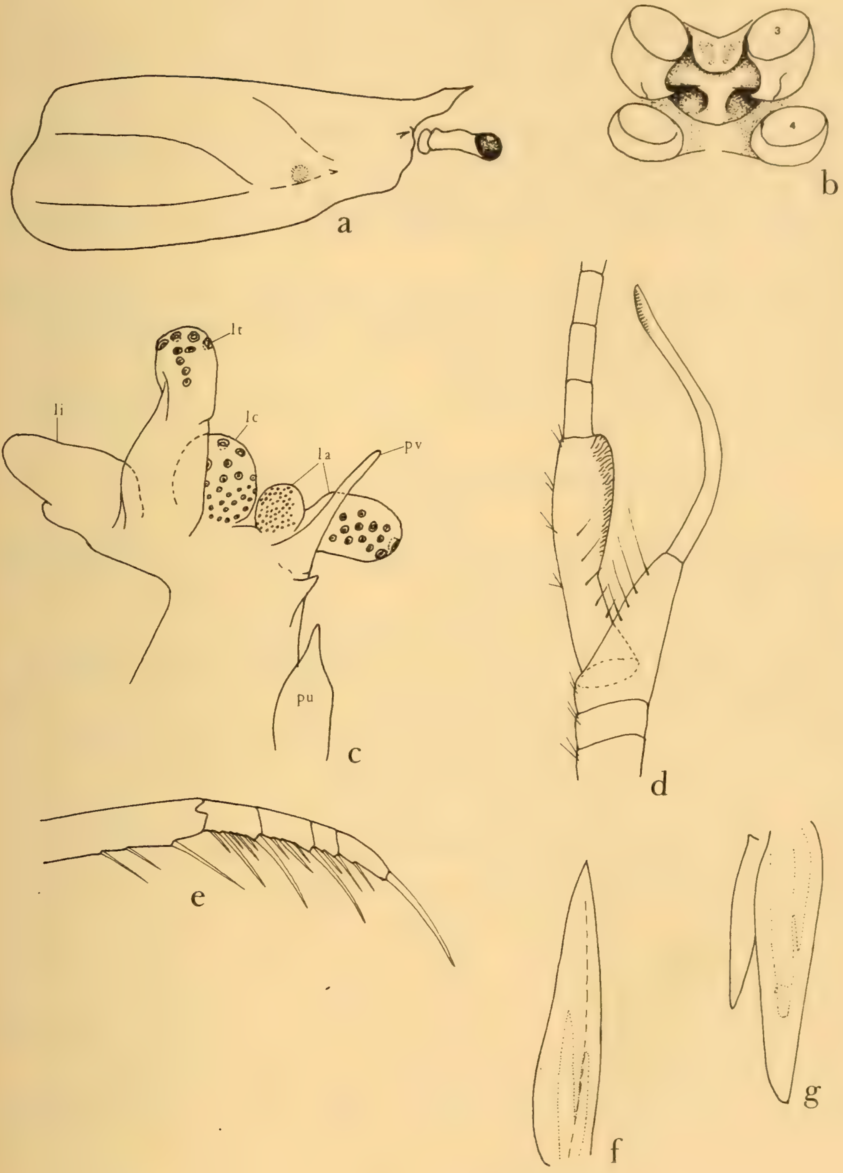

FIG. 8. *Sergestes* (*Sergestes*) *armatus*
a. Carapace in lateral view; *b*. Female coxa pereiopod three; *c*. Petasma; *d*. Male, outer antennular flagellum, *e*. Maxilliped three dactylus; *f*. Scaphocerite; *g*. Uropod.

short slender, two distal segments setose on only one margin. Coxa pereiopod three in female with short acute median facing process, sternum with rounded flap-like operculum. Outer ramus of uropod setose for slightly more than two-thirds length of outer margin. Telson apically narrowly rounded. Petasma in male with elongate lobus terminalis armed with distal hooks, lobus inermis unarmed, stout, lobus connectens globular with numerous hooks, lobus armatus consisting of small rounded lobe armed with numerous tiny hooks and elongate rounded lobe with large hooks. Processus ventralis slender, elongate, with small process at its base. Processus uncifer apically pointed.

Distribution: North Atlantic, Mediterranean, off Azores and Canaries, South Atlantic.

South African stations: A318, A319, IK6, IK7, IK34, IK35, IK36, IK37, IK38, IK39, IK41, IK42, IK44, IK45, IK46, IK51, A1896, A2958, A2962, A2963, A2966, A2968, A3634, A3643, A4229.

Material: Average carapace length for 20 ♂♂: 10·9 mm. Average carapace length for 28 ♀♀: 11·9 mm.

Sergestes (*Sergestes*) *atlanticus* H. Milne Edwards, 1830

Fig. 9

Sergestes atlanticus. H. Milne Edwards, 1830: 346. Bate, 1888: 389, pls 48, 49. Ortmann, 1893: 33. Hansen, 1896: 951; 1903: 58; 1919: 8, 1922: 41, pl. 2, fig. 1. Illig, 1914: 350, fig. 2; 1927: 286, figs 11–14. Sund, 1920: 7, fig. 4.

Sergestes (*Sergestes*) *atlanticus* Yaldwyn, 1957: 8. Kensley, 1968: 303, figs 9*d*, 10*c*, 11*d*.

Description: Rostrum hardly elevated, short, apically acute, slight supraorbital ridge, strong supraorbital spine. Cervical groove distinct, dorsally feeble, strong hepatic spine at its base. Suprabranchial ridge distinct. Eye reaching to midpoint of basal antennular peduncle segment. Latter elongate, basal segment equal in length to third segment, middle segment shorter. Scaphocerite reaching to about midpoint of third antennular peduncle segment, with small terminal spine on outer margin. Maxilliped three slender, equal in length to pereiopod three, dactylus of eight segments, decreasing in length distally. Fifth pereiopod about half length of fourth, two distal segments setose on only one margin. Outer margin of outer uropod ramus with spine at distal third. Telson apically acutely rounded. Petasma in male, with broadly triangular processus ventralis, lobus armatus low, rounded, armed with several hooks, lobus connectens small slender, lobus terminalis a bulge armed with hooks on lobus inermis, latter a rounded unarmed lobe. Processus uncifer with minute terminal hook.

Distribution: Mediterranean, North Atlantic, off Azores and Canaries, Sargassum Sea, off Cape Point.

South African stations: IK6, A2966.

Material: Carapace length (mm)

♂
5·3
6·8

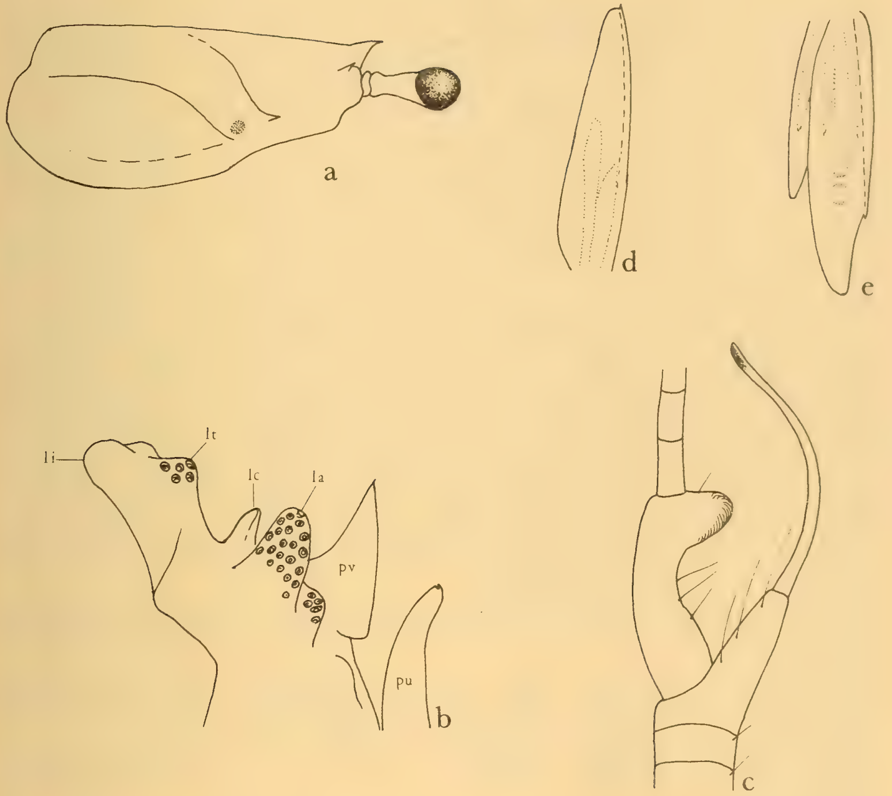

Fig. 9. *Sergestes* (*Sergestes*) *atlanticus*
a. Carapace in lateral view; *b.* Petasma; *c.* Outer flagellum antennular; *d.* Scaphocerite; *e.* Uropod.

Sergestes (*Sergestes*) *corniculum* Kröyer, 1955

Fig. 10

Sergestes corniculum Kröyer, 1855: 22. Ortmann, 1893: 34. Hansen, 1896: 957; 1922: 126, pl. 1, figs 6, 7, pl. 7, fig. 3*a–q*, pl. 8, fig. 1*a–i*. Sund, 1920: 9, figs 6–10. Illig, 1914: 357, figs 6–10; 1927: 311, figs 68–76. Burkenroad, 1937: 316.

Sergestes (*Sergestes*) *corniculum*: Yaldwyn, 1957: 7. Kensley, 1968: 307, figs 9*a*, 10*b*, 11*b*.

Description: Rostrum broadly rounded with single apical point. Supraorbital ridge present. Well defined cervical groove, reaching dorsum at carapace midpoint. Well-defined suprabranchial and branchial ridges. Minute hepatic spine present, from which a strong ridge runs anteriorly to level of antennae. Eyestalk with ocular tubercle on medio-distal face. Eye reaching midpoint of basal antennular peduncle segment. Scaphocerite lacking apical spine, reaching almost to midpoint of third antennular peduncle segment. Maxilliped three slender, not longer than pereiopod three. Latter slender, elongate, reaching well beyond antennular peduncle, propodus and carpus bearing along their edges numerous elongate spines separated by several smaller spines. Coxa pereiopod three in female bearing blunt median process, sternum with straight-edged flap-like operculum. Telson apically acute, outer margin of exopod uropod setose for about half its length. Petasma in male with processus ventralis distally expanded, bearing about 11 or 12 acute papillae. Lobus armatus stout, curved, apically and proximally armed with hooks. Lobus connectens slender armed with two apical hooks. Lobus terminalis armed with cluster of hooks distally. Lobus inermis slender elongate, apically pointed, unarmed. In preserved specimens, scattered pigment spots may be observed on the dorsal surface of the carapace and abdomen.

Distribution: Mediterranean, North Atlantic, off the Azores and Canary Islands, Sargassum Sea.

South African stations: A321, IK6, IK34, IK35, IK39, IK41, IK42, IK44, IK48, IK50, A2958, A2962, A2963, A2968, A3616, A3634, A4218.

Material: Average carapace length for 21 ♂♂: 20·1 mm. Average carapace length for 22 ♀♀: 21·0 mm.

Sergestes (*Sergestes*) *disjunctus* Burkenroad, 1940

Fig. 11

Sergestes (*Sergestes*) *disjunctus* Burkenroad, 1940: 38. Yaldwyn, 1957: 8.

Description: Rostrum slightly elevated, with short acute anteriorly facing apex. Strong supraorbital spine present. Well-developed cervical groove, stretching forward from about the dorsal midpoint of the carapace, with strong hepatic spine at its base. Strong suprabranchial and lateral branchial ridges, also a ridge stretching anteriorly from hepatic spine almost to anterior margin of carapace, in antennal region. Eyes laterally directed, eyestalk with very low ocular tubercle. Basal segment of antennular peduncle equal in length to third segment, middle segment slightly shorter. Scaphocerite damaged. Third

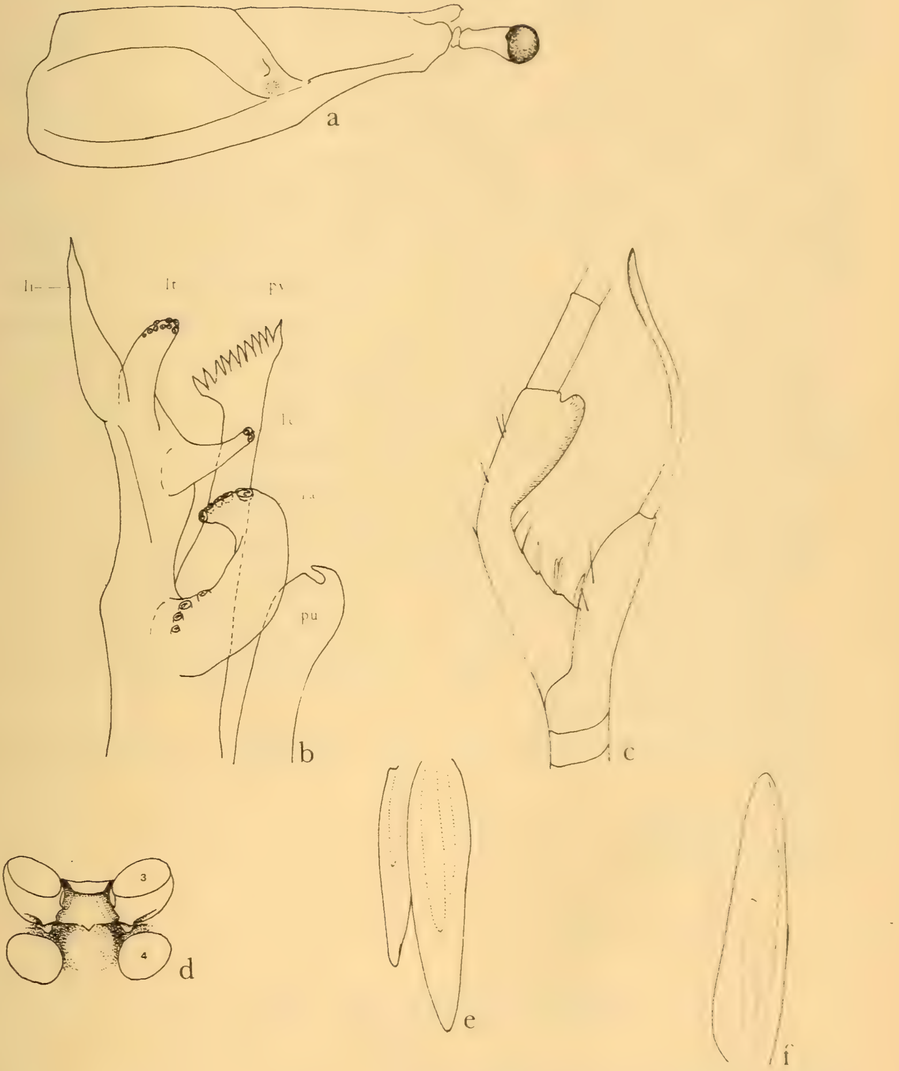

Fig. 10. *Sergestes* (*Sergestes*) *corniculum*
a. Carapace in lateral view; *b*. Petasma; *c*. Outer antennular flagellum; *d*. Female coxae pereiopod three; *e*. Uropod; *f*. Scaphocerite.

maxillipeds missing but coxae not larger than those of pereiopods one to three. Pereiopods four and five flattened, bearing long setae, fifth about half length of fourth, two distal segments setose on both margins. Outer ramus of uropod with outer margin lacking spine, setose for slightly more than half its length. Telson damaged. Petasma in male with elongate straight lobus armatus, bearing small cluster of terminal hooks separated by an unarmed area from larger cluster of proximal hooks. Lobus connectens stouter than lobus terminalis, covered with numerous small hooks. Lobus terminalis slender, with several terminal hooks, lobus inermis as slender as lobus terminalis, unarmed. Processus ventralis apically flared, bearing seven or eight small irregularly spined papillae.

Remarks: Although most of the third maxillipeds of these specimens are missing, the size of the remaining coxae indicate that these appendages were not of the elongate and stout type as found in the 'sargassi' group. This fact, together with the setose nature of both margins of the fifth pereiopods, places the specimens in the 'corniculum' group (Yaldwyn, 1957: 7). Superficially the specimens are almost identical to *S. corniculum* Kröyer, but the structure of the petasma immediately separates them. The lobus armatus is curved in *S. corniculum*, the lobus connectens slender, the processus ventralis bearing a continuous row of terminal spines. The present specimens differ in all these characters. The lower flagellum of the antennule also lacks some of the spines found in *S. corniculum*. The presence of a supraorbital spine also separates the specimens from *S. corniculum*, *S. coalitus* Burkenroad, *S. erectus* Burkenroad, and *S. seminudus* Hansen. The specimens also differ from the latter species in the structure of the petasma, where the lobus connectens is relatively more slender and the lobus terminalis more stout.

The present South African records are separated by several thousand miles from the original *Dana* record of *S. disjunctus;* nevertheless, the specimens are placed in this species as they agree well with both Burkenroad's description, and with the type material.

Distribution: 34·24S, 178·42E. (Off North Island, New Zealand, *Dana* station 3630 IV).

South African stations: A317, A4128.

Material: Carapace length (mm)

♂
15·9
18·0

Sergestes (*Sergestes*) *orientalis* Hansen, 1919

Fig. 12

Sergestes orientalis Hansen, 1919: 22, pl. 2, fig. 2.
Sergestes (*Sergestes*) *orientalis:* Yaldwyn, 1957: 8. Milne, 1968: 30.

Description: Rostrum short, slightly elevated, apically acute. Small supraorbital spine present. Cervical groove barely visible, with strong hepatic spine at its base. Eyes reaching slightly beyond midpoint of basal antennular peduncle

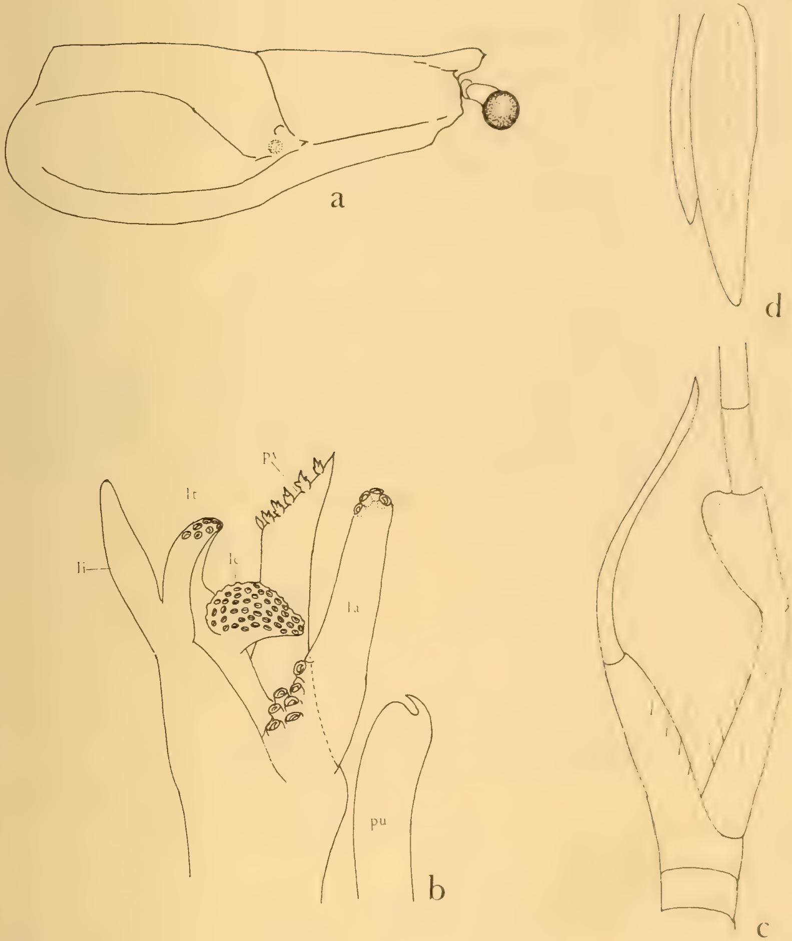

FIG. 11. *Sergestes* (*Sergestes*) *disjunctus*
a. Carapace in lateral view; *b*. Petasma; *c*. Outer antennular flagellum; *d*. Uropod.

segment, scarcely wider than eyestalk. Antennular peduncle with basal segment equal in length to third segment, middle segment shorter. Maxilliped three much longer than pereiopods, four proximal segments stout, two distal segments slender, flattened. Dactylus consisting of six segments, first slightly shorter than second, four distal segments small, equal in length, three together equal to second segment in length. Terminal segment bearing a long and short spine terminally. Fifth pereiopods with two distal segments setose on only one margin. Coxa pereiopod three in female with short pointed basal protuberance.

Distribution: South-east of South Africa, China Sea.

Remarks: The enlarged third maxillipeds, having a six-segmented dactylus, and a fifth pereiopod with the two distal segments setose on only one margin, places these females in the 'edwardsi' group of species (Yaldwyn, 1957). *S.* (*S.*) *edwardsi* has a more slender lanceolate rostrum, and two subequal terminal dactyl spines on the third maxilliped, unlike the present specimens, which have a broader rostrum, and very unequal terminal spines. *S.* (*S.*) *tantillus* and *S.* (*S.*) *semissis*, both described by Burkenroad in 1940, are said to have the third maxillipeds as in *S. edwardsi*. *S. consobrinus* Milne is very similar to the present specimens, but the spine count of the dactyl of the third maxilliped (36) does not agree with the former species (47–50). Thus, in spite of the lack of a male specimen to confirm the specific identity, these females are placed in *S.* (*S.*) *orientalis*. Comparison with Hansen's *Siboga* cotype material has further strengthened this identification.

South African stations: A2945, A2966.

Material: Carapace length (mm)

♀
6·9
7·3
8·0

Sergestes (*Sergestes*) *pectinatus*, Sund, 1920

Fig. 13

Sergestes pectinatus Sund, 1920: 24, figs 42–43. Hansen, 1922: 142, pl. 8, fig. 4. Illig, 1927: 315, figs 77–80.

Sergestes (*Sergestes*) *pectinatus:* Yaldwyn, 1957: 8.

Sergestes henseni (*non* Ortmann) Illig, 1914: 360, figs 11–16.

Description: Rostrum short, hardly elevated, apically acute, anterior margin vertical. No supraorbital ridge, strong supraorbital spine. Cervical groove well-developed with small hepatic spine at its base. Strong suprabranchial ridge present. Eyestalk, with tiny ocular tubercle on inner distal margin, reaching beyond midpoint of basal segment of antennular peduncle. Latter with two distal segments equal in length, basal segment slightly longer. Scaphocerite with tiny spine on outer distal angle. Maxilliped three longer than periopods, four basal segments stout, two distal segments slender. Dactylus consisting of five segments basal segment about twice length of following seg-

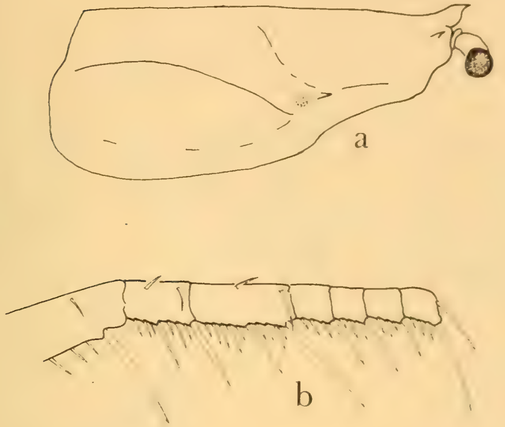

FIG. 12. *Sergestes* (*Sergestes*) *orientalis*
a. Carapace in lateral view; *b*. Maxilliped three dactylus.

ment, distal four segments of about equal length. Dactylus and distal half of propodus with a fringe of short spines forming a comb-like structure, interspersed with single longer spines. Pereiopods four and five flattened, fifth about half length of fourth, two distal segments setose on both margins. Coxa pereiopod three in female with short hooked basal protuberance, sternum with triangularly rounded flap-like operculum. Outer uropod ramus lacking spine on outer margin, latter setose for about four-fifths of its length. Telson apically acutely rounded. Petasma in male lacking lobus inermis and lobus connectens. Lobus armatus basally stout distally slender, slightly curved, with single apical hook, two large proximal hooks. Lobus terminalis elongate curved, with single apical hook, two large proximal hooks. Processus ventralis slender, elongate, unarmed.

Distribution: Sargassum sea, North Atlantic, off Canaries, Azores.

South African stations: A2386, A3641.

Material: Carapace length (mm)

♂	♀
4·1	5·0
6·5	8·3
	8·3

Sergestes (*Sergestes*) *sargassi* Ortmann, 1893

Fig. 14

Sergestes sargassi Ortmann, 1893: 34, pl. 3, fig. 1. Hansen, 1896: 959; 1922: 148, pl. 9, fig. 2.
Sergestes (*Sergestes*) *sargassi*: Yaldwyn, 1957: 8. Kensley, 1968: 304, figs 9*c*, 10*d*, 11*c*.
Sergestes henseni (*non* Ortmann) Sund, 1920: 25, figs 44–47.

Description: Rostrum hardly elevated, apically acute, anterior margin vertical. No supraorbital ridge, minute supraorbital spine present. Well-defined cervical

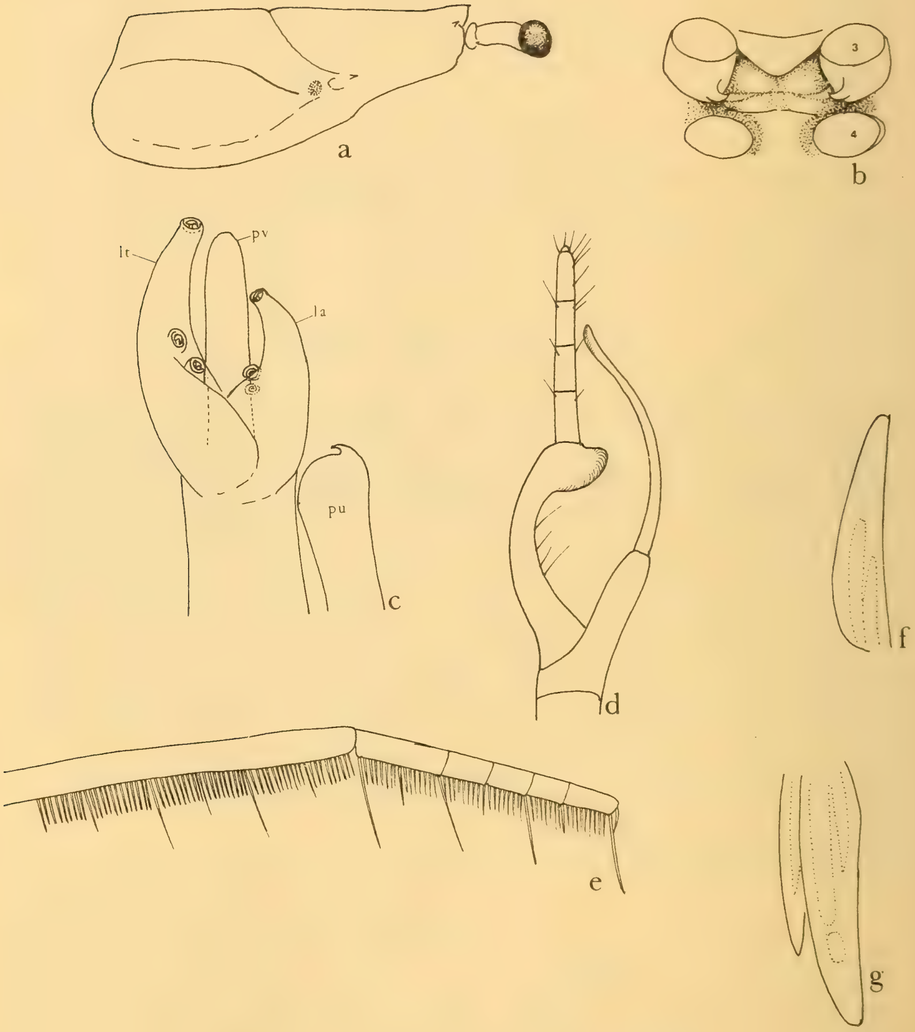

FIG. 13. *Sergestes* (*Sergestes*) *pectinatus*
a. Carapace in lateral view; *b*. Female coxae pereiopod three; *c*. Petasma;
d. Outer flagellum antennular; *e*. Propodus distal end and dactylus of maxilliped three;
f. Scaphocerite; *g*. Uropod.

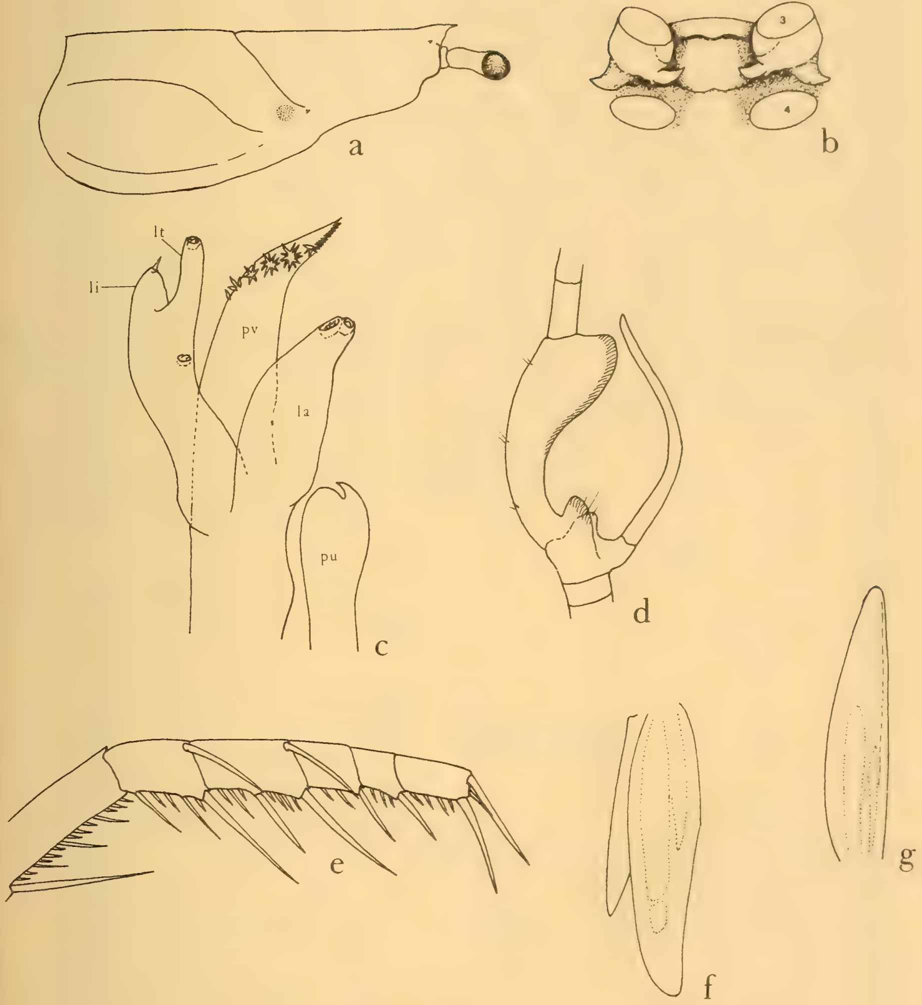

Fig. 14. *Sergestes* (*Sergestes*) *sargassi*
a. Carapace in lateral view; *b*. Female coxae pereiopod three; *c*. Petasma; *d*. Outer antennular flagellum; *e*. Dactylus of maxilliped three; *f*. Uropod; *g*. Scaphocerite.

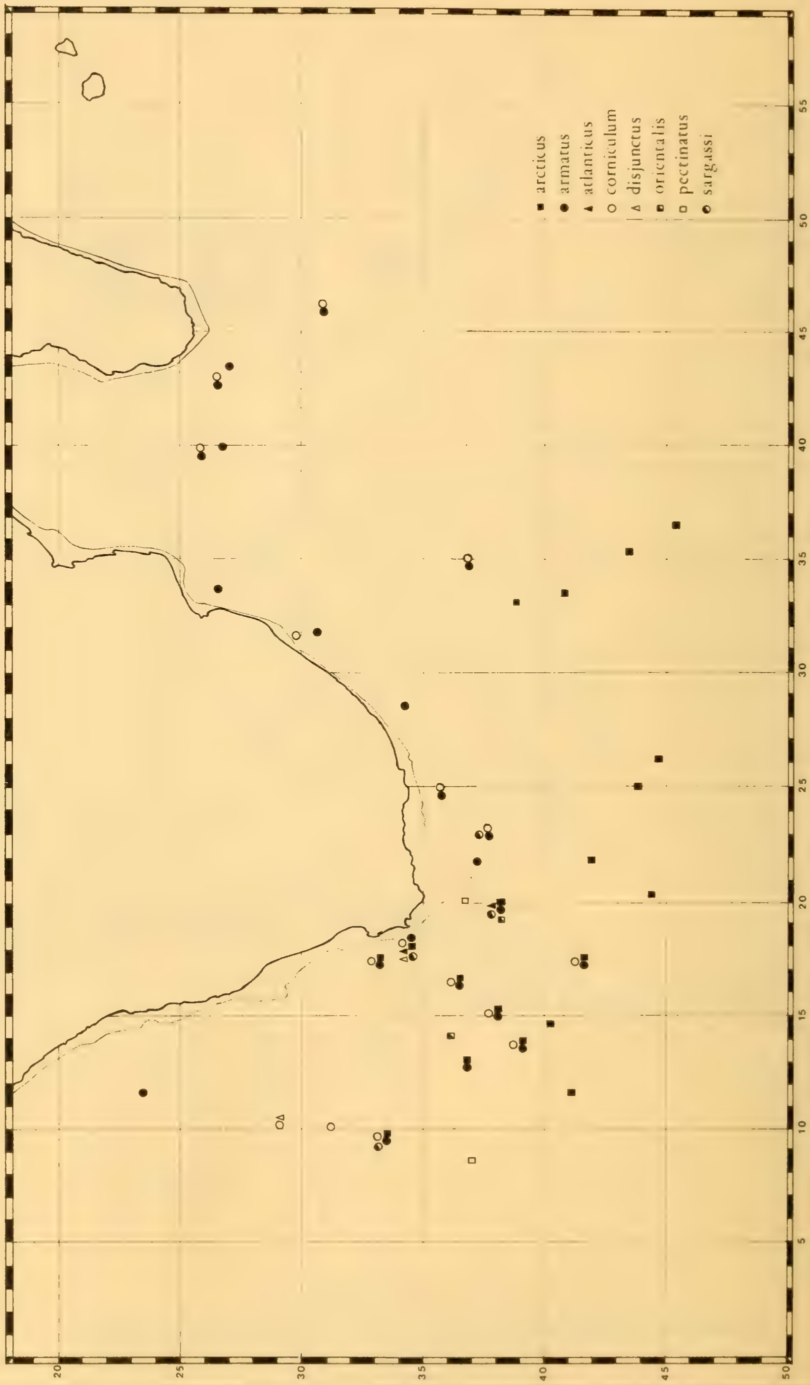

FIG. 15. Map showing distribution of the subgenus *Sergestes* around southern Africa.

groove stretching forward from dorsal midpoint of carapace with a minute hepatic at base. Strong suprabranchial ridge. Eyes reaching to midpoint of basal segment of antennular peduncle. Latter slender, two distal segments equal in length, basal segment slightly longer. Scaphocerite lacking spine on outer distal margin. Maxilliped three longer than pereiopods, four basal segments stout, two distal segments slender. Dactylus consisting of five segments, basal segment equal in length to distal segment, second segment longest, third and fourth segments together equal to terminal segment. Latter with two long and one short terminal spines. All segments bearing a few long spines and numerous short spines. Propodus with similar spination distally. Pereiopods slender, third reaching slightly beyond antennular peduncle. Fifth pereiopod less than half length of fourth, two distal segments setose on both margins. No spine on outer margin of outer uropod ramus. Telson narrow, apically acutely rounded. Coxa pereiopod three in female bearing on postero-medial angle, a tridentate process, the two outer teeth being small, the median tooth strong, incurved. The postero-lateral angle of the coxa bears a large outwardly curved horn-shaped protuberance. Petasma in male with lobus armatus elongate stout, with two strong terminal hooks, lobus terminalis slender, with single terminal hooks basally joined to lobus inermis bearing a terminal spine. Processus ventralis elongate with several distal stellate spines, plus row of single spines.

Distribution: Off Madeira, Azores, Sargassum Sea.

South African stations: IK6, IK39, A2966, A3634.

Material: Carapace length (mm)

♂	♀
7·0	8·0
7·8	
8·0	
8·2	

Key to known southern African species of the subgenus Sergia

1.	Dermal photophores present	2
—.	Dermal photophores absent	*laminatus*
2.	Photophores bearing cuticular lenses	3
—.	Photophores lacking lenses, of opaque spot type	4
3.	Lower branchiostegite bearing row or at least 18 photophores. Scaphocerite bearing about 12 photophores	*prehensilis*
—.	Lower branchiostegite bearing row of 9–12 minute photophores. Scaphocerite bearing seven photophores	*scintillans*
4.	Rostrum elongate/lanceolate	*creber*
—.	Rostrum not elongate/lanceolate	5
5.	Rostrum strongly bidentate or bifid	6
—.	Rostrum with single apical tooth	7
6.	Strong post-cervical groove present. Coxa of pereiopod three female with apically acute leaf-shaped process. Petasma of six lobes (excluding processus uncifer)	*regalis*
—.	No post-cervical groove present. Coxa of pereiopod three female with blunt process. Petasma male with eight lobes (excluding processus uncifer)	*potens*

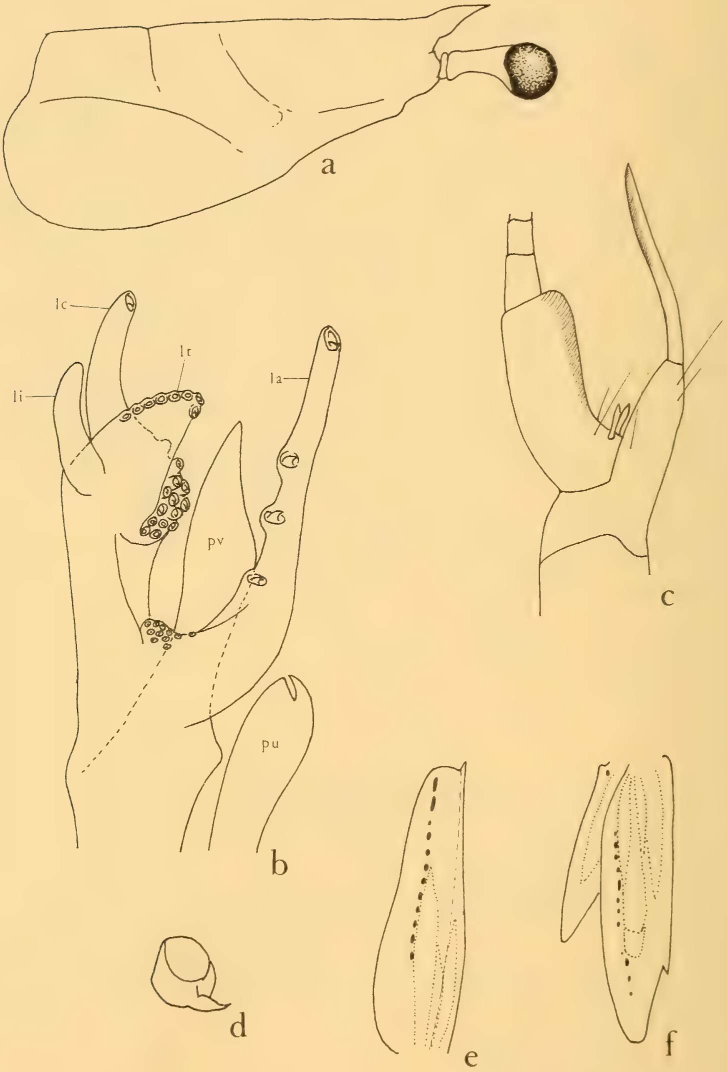

Fig. 16. *Sergestes* (*Sergia*) *creber*
a. Carapace in lateral view; *b*. Petasma; *c*. Outer antennular flagellum;
d. Female coxa pereiopod three; *e*. Scaphocerite; *f*. Uropod.

7.	Rostrum broadly rounded. Outer uropod ramus with two groups of photophores	*grandis*
—.	Rostrum not broadly rounded, with hint of dorsal denticle. Outer uropod ramus with single continuous row of small photophores .	*splendens*

Sergestes (*Sergia*) *creber* Burkenroad, 1940

Fig. 16

Sergestes (*Sergia*) *creber* Burkenroad, 1940: 44. Yaldwyn, 1957: 9.

Description: Rostrum elongate, elevated, tapering to sharp point. No supra-orbital ridge or spine. Cervical groove laterally visible, dorsally obsolete. No hepatic spine, but a slight knob present. Post-cervical groove dorsally and laterally prominent. Eyestalk lacking ocular tubercle, reaching to middle of basal antennular peduncle segment. Latter longer than second or third segments. Maxilliped three slender, not longer than pereiopods. Pereiopod three reaching well beyond antennular peduncle. Coxa pereiopod three in female bearing large leaf-shaped apically acute process. Scaphocerite almost reaching middle of third peduncular segment, bearing row of about 12 photophores of the opaque-spot type. Fifth pereiopod half length of fourth, both bearing long setae flattened. Sixth abdominal segment ending dorsally in sharp spine. Outer uropod ramus with spine at about distal third on outer margin, bearing about 12 photophores. Telson apically acute. Petasma male with slender curved unarmed lobus inermis. Lobus terminalis broadly triangular, with single row of about eight hooks on upper margin. Lobus connectens longer than lobus terminalis, with single terminal hook and numerous proximal hooks. Lobus armatus elongate slender, with large terminal hook and three large hooks in mid-region, small lobus accessorius at base bearing several tiny hooks. Processus ventralis leaf-shaped, shorter than lobus armatus, unarmed.

Distribution: 01·13S, 138·42E. (Off northern coast of New Guinea, *Dana* Station 3766 XVIII.)

South African stations: IK35, A3643.

Material: Carapace length (mm)

♂	♀
15·0	19·9
18·5	

Remarks: These specimens are very similar to *S. regalis* Gordon but differ in the following respects: the rostrum is elongate-lanceolate, whereas in *S. regalis* it is almost always bidentate. There are also differences in the spination of the lower antennular flagellae, and in the photophore pattern of the outer uropod ramus, there being more photophores in the present species. The petasma is also very similar to *S. regalis*, the only differences being in the more slender lobus inermis, and in the lower number of hooks on the lobus armatus in the present species. Burkenroad (1940) does not compare his species with *S. regalis* which was described in the previous year. The present specimens are placed in *S. creber*, in spite of the fact that the latter species has not been figured, and that

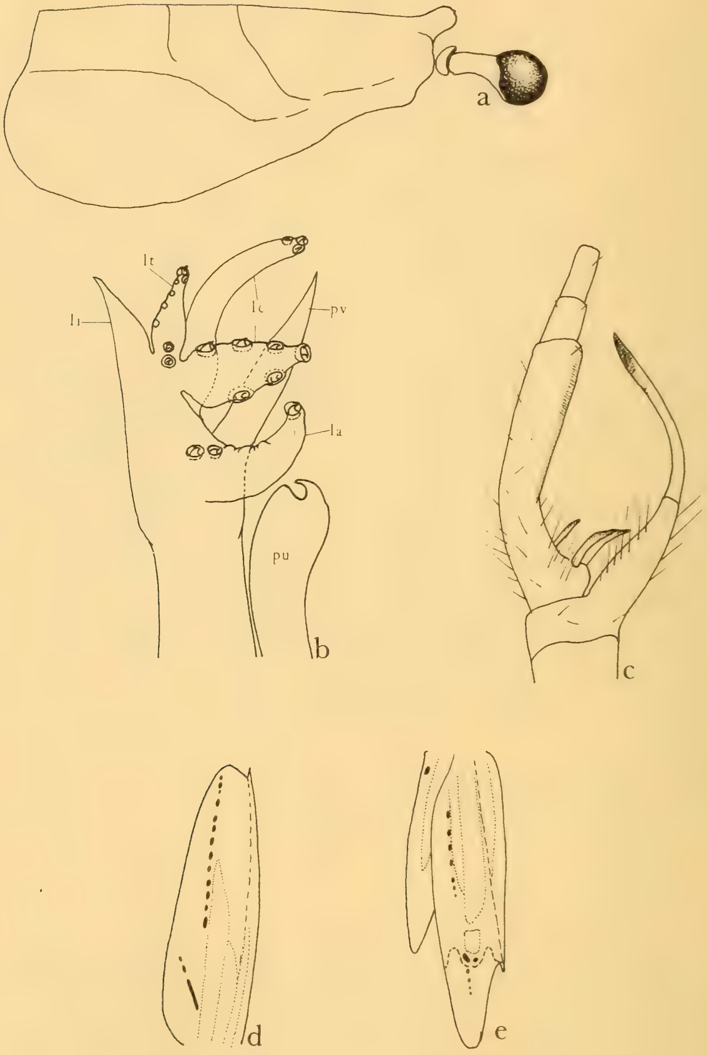

Fig. 17. *Sergestes* (*Sergia*) *grandis*
a. Carapace in lateral view; *b*. Petasma; *c*. Outer antennular flagellum; *d*. Scaphocerite; *e*. Uropod.

the present records are separated by several thousand miles from the original *Dana* record. Comparison with the type material of *S. creber* strengthens this identification.

Sergestes (*Sergia*) *grandis* Sund
Fig. 17

Sergestes grandis Sund, 1920: 16, figs 22–26. Hansen, 1922: 92, pl. 5, figs 3*a–p*.
Sergestes (*Sergia*) *grandis:* Yaldwyn, 1957: 9.

Description: Rostrum low, rounded, with small apical tooth. No supraorbital spine or ridge. Cervical groove dorsally and laterally fairly prominent. Posterior cervical groove present, but not very obvious. Suprabranchial groove strong. No hepatic spine or knob. First and second antennular peduncle segments equal in length third segment shorter. Eyestalk with tiny ocular tubercle at distomedial corner. Scaphocerite reaching to middle of third peduncular segment, bearing row of opaque-spot photophores. Third maxilliped not longer or more robust than rest of pereiopods. Fourth and fifth pereiopods flattened, bearing long setae. Two distal segments pereiopod five setose on both margins. Outer margin of outer uropod ramus with spine at distal third. Petasma with lobus inermis unarmed, apically acute, lobus terminalis slender, with few scattered hooks. Lobus connectens bilobed, upper lobe slender, curved, with few apical hooks, lower lobe broader with several large hooks. Lobus armatus short, curved, armed with few scattered hooks. Processus ventralis slender, tapering, unarmed, reaching almost to tip of upper lobus connectens lobe. Coxa pereiopod three in female with blunt short median lobe, similar to *Sergestes potens*.

Distribution: North Atlantic.

South African stations: IK35, WR2.

Material: Carapace length (mm)

♂	♀
15·0	18·3
17·6	
22·0	
26·4	

Remarks: The presence of opaque-spot type photophores places this species in the 'robustus' group. The petasma is in general similar to that of *S. grandis*, as figured by Sund (1920) and Hansen (1922), but differs in the relative proportions of the lobes, the upper lobus connectens lobe being much longer than as figured. The lower lobe also differs somewhat from the figures. The lobus armatus is slightly longer than in Hansen's figures. The structure of the scaphocerite and uropod, however, is identical with Sund's description, while comparison with material from the *Atlantide* Expedition, from the Universitetets Zoologiska Museum, Copenhagen, further strengthens this identification.

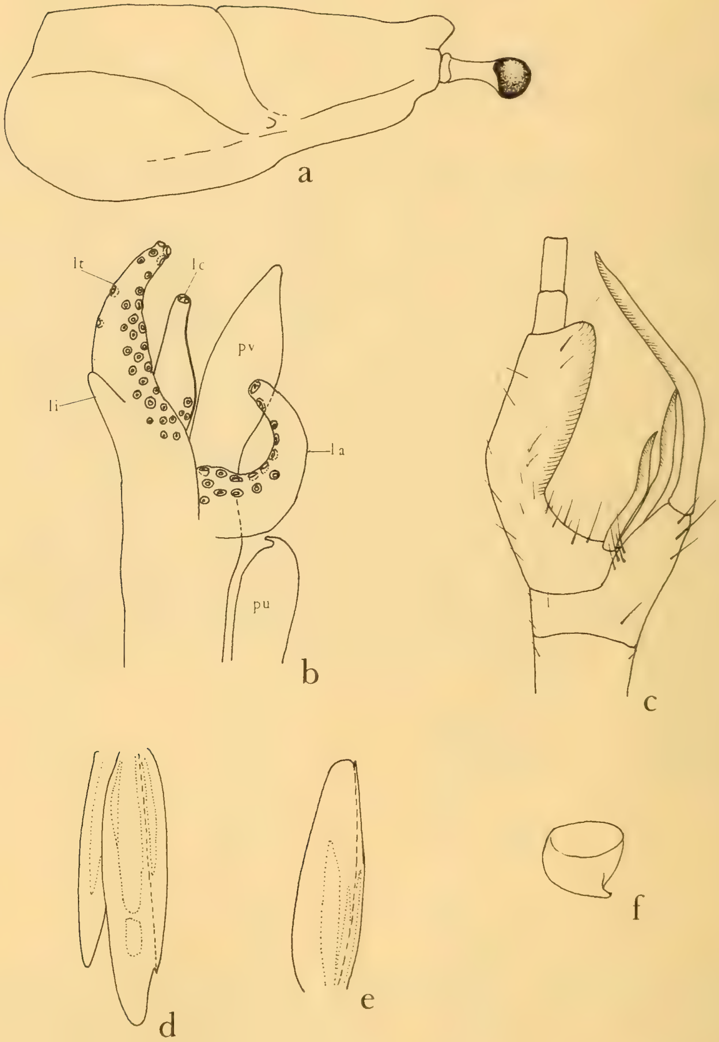

FIG. 18. *Sergestes* (*Sergia*) *laminatus*
a. Carapace in lateral view; *b*. Petasma; *c*. Outer antennular flagellum; *d*. Uropod; *e*. Scaphocerite; *f*. Female coxa pereiopod three.

Sergestes (*Sergia*) *laminatus* Burkenroad, 1940

Fig. 18

Sergestes (*Sergia*) *laminatus* Burkenroad, 1940: 53. Yaldwyn, 1957: 9.

Description: Rostrum low, rounded, no apical spine, very slight supra-orbital ridge, no supraorbital spine. Integument membranous, cervical groove dorsally and laterally distinct. Suprabranchial ridge prominent. No hepatic spine but a slight knob present. Slight ridge running anteriorly from this knob. Eyestalk with small ocular tubercle on inner distal margin. Antennular peduncle short, eye reaching slightly beyond midpoint of basal segment. Two distal segments together equal to basal segment in length. Scaphocerite reaching to beyond midpoint of third segment, with small apical spine on outer distal margin. Maxilliped three slender, not longer than pereiopods two or three. Coxa pereiopod three in female with very short pointed process. Fifth pereiopod short, flattened, two distal segments setose on both margins. Outer uropod ramus with spine on outer margin, setose portion of which about one third length of non-setose portion. Telson apically acute. No dermal photophores visible in preserved specimens. Petasma in male with strongly curved lobus armatus bearing several hooks along inner margin, lobus terminalis elongate curved, bearing small lobus inermis near its base, whole of inner face armed with hooks. Lobus connectens elongate, shorter than lobus terminalis, with single terminal hook and several proximal hooks. Processus ventralis a large broad unarmed leaf-shaped process, slightly shorter than lobus terminalis. Lower antennular flagellum male bearing two stout serrated spines on the third segment.

Distribution: 11·18S, 50·03E. (Off northern coast of Malagasy Republic, *Dana* stations 933 1.)

South African stations: A1892, A2961, A2962, A2966, A4218.

Material: Carapace length (mm)

♂	♀
5·6	7·9
6·0	8·2
6·7	8·2
9·0	9·0
	9·7

Remarks: The petasma of the present species closely resembles that of *S. bisulcatus* Wood-Mason, but differs in having a much shorter lobus inermis, and a more strongly curved lobus armatus. The present specimens also differ from *S. bisulcatus* in the shape of the rostrum. In the latter species it is elongate and apically very acute, whereas the present specimens have a short blunt rounded rostrum. Burkenroad (1940), when discussing the affinities of *S. laminatus*, noted that it was most closely related to *S. japonicus* and *S. kroyeri*. The present specimens differ from *S. japonicus* mainly in the shape of the processus ventralis of the petasma, which is not broad and leaf-shaped in the latter. The carapace, and

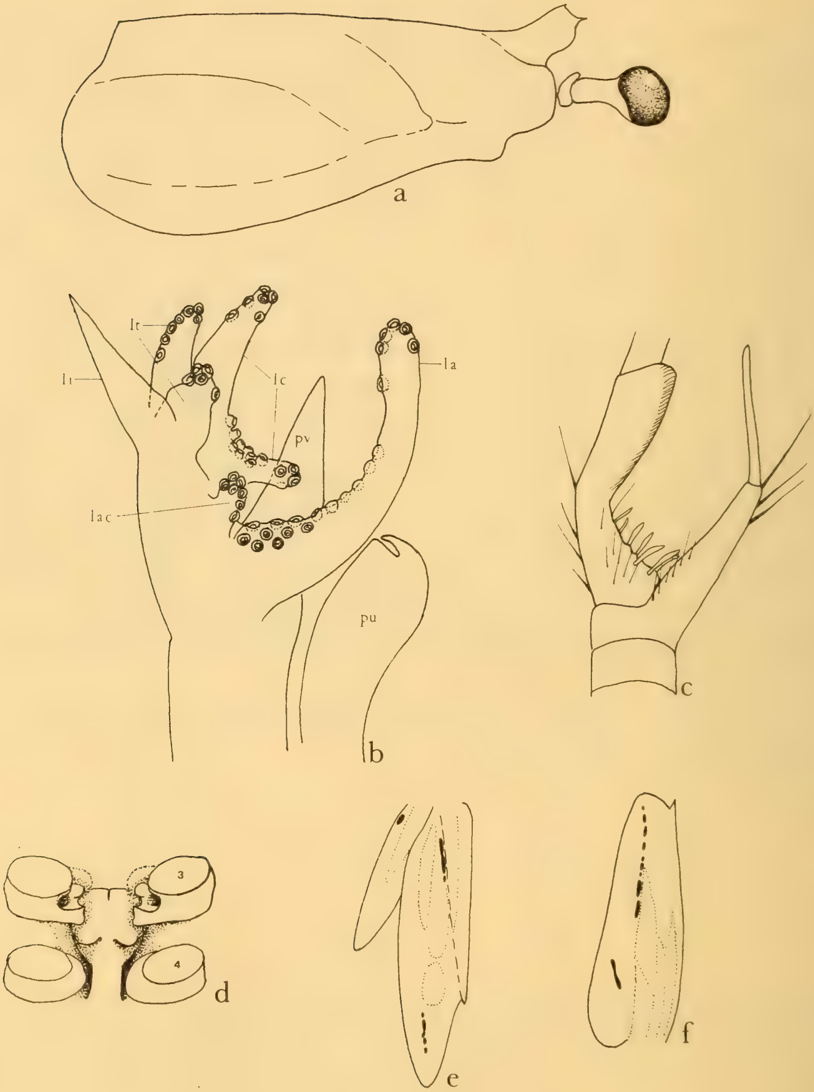

Fig. 19. *Sergestes* (*Sergia*) *potens*
a. Carapace in lateral view; *b*. Petasma; *c*. Male outer antennular flagellum; *d*. Female coxae pereiopod three; *e*. Uropod; *f*. Scaphocerite.

particularly the rostral shape, is very similar. *S. laminatus* differs from *S. kroyeri* Bate in the petasma which in the latter has a long lobus inermis, a bilobed lobus armatus, and a slender processus ventralis.

The *Dana* material of this species came from off the northern coast of the Malagasy Republic. The present records, being both southern Atlantic and south-west Indian Ocean, are thus considerable extensions of the known range.

Sergestes (*Sergia*) *potens* Burkenroad, 1940

Fig. 19

Sergestes potens Burkenroad, 1940: 48.
Sergestes (*Sergia*) *potens:* Yaldwyn, 1957: 15, figs 11–19.
Sergestes phorcus (*non* Faxon) Barnard, 1950: 641, fig. 120*e–g*. Grindley & Penrith, 1965: 281.
Sergestes bisulcatus (*non* Wood-Mason) Stebbing, 1905: 87, pl. 24a; 1910: 381.
Sergestes grandis (*non* Sund) Hansen, 1925: 23.

Description: Rostrum apically acute, separated by a short straight portion from a dorsal (occasionally two) denticle. No supraorbital spine or ridge; no hepatic spine, but a blunt knob. Cervical groove laterally distinct, dorsally obsolete. Strong suprabranchial ridge present. Eye slightly more than half length basal antennular peduncle segment. Scaphocerite reaching midpoint of third peduncle segment, bearing row of opaque spot photophores. Sixth abdominal segment longer than telson, ending dorsally in tiny spinule. Maxilliped three slender, shorter than pereiopods two or three, reaching slightly beyond antennular peduncle. Pereiopod five half length of four, flattened, two distal segments setose on both margins. Coxa pereiopod three in female produced medially into two blunt lobes, sternum with two bulbous swellings. Petasma in male with long curved proximally and distally armed lobus armatus, with a short lobus accessorius at its base. Lobus connectens bilobed, two lobes forming a crescent, both armed with hooks. Lobus terminalis bilobed, outer lobe longer, both armed distally with hooks. Lobus inermis tapering, unarmed, apically acute. Processus ventralis acutely triangular, unarmed.

Distribution: Eastern Pacific, off New Zealand, off Cape Point.

South African stations: PF16641, IK6, IK14, IK18, IK33, IK36, IK40, IK44, IK46, A2948, A2953, A2968, A4218.

Material: Average carapace length 12 ♂♂: 23·5 mm. Average carapace length 18 ♀♀: 21·9 mm.

Sergestes (*Sergia*) *prehensilis* Bate, 1881

Fig. 20

Sergestes prehensilis Bate, 1881: 193; 1888: 385, pl. 71. Hansen, 1903: 56, pl. 11, fig. 4. Gordon, 1935: 314, fig. 1*a*, 3*b*, 6*c*, *d*, 8*a*, *b*, *c*, 9*a*, *b*, *c*, *d*.
Sergestes (*Sergia*) *prehensilis:* Yaldwyn, 1957: 9. Kensley, 1968: 308; 1969: 154.
Sergestes gloriosus Stebbing, 1905: 84, pls 22, 23; 1910: 381. Hansen, 1925: 24. Barnard, 1950: 642, fig. 120*h*, *i*, *j*. Grindley & Penrith, 1965: 281.

Description: Rostrum apically acute, occasionally with tiny dorsal denticle, no supraorbital spine or ridge. No hepatic spine present, but blunt knob. Cervical

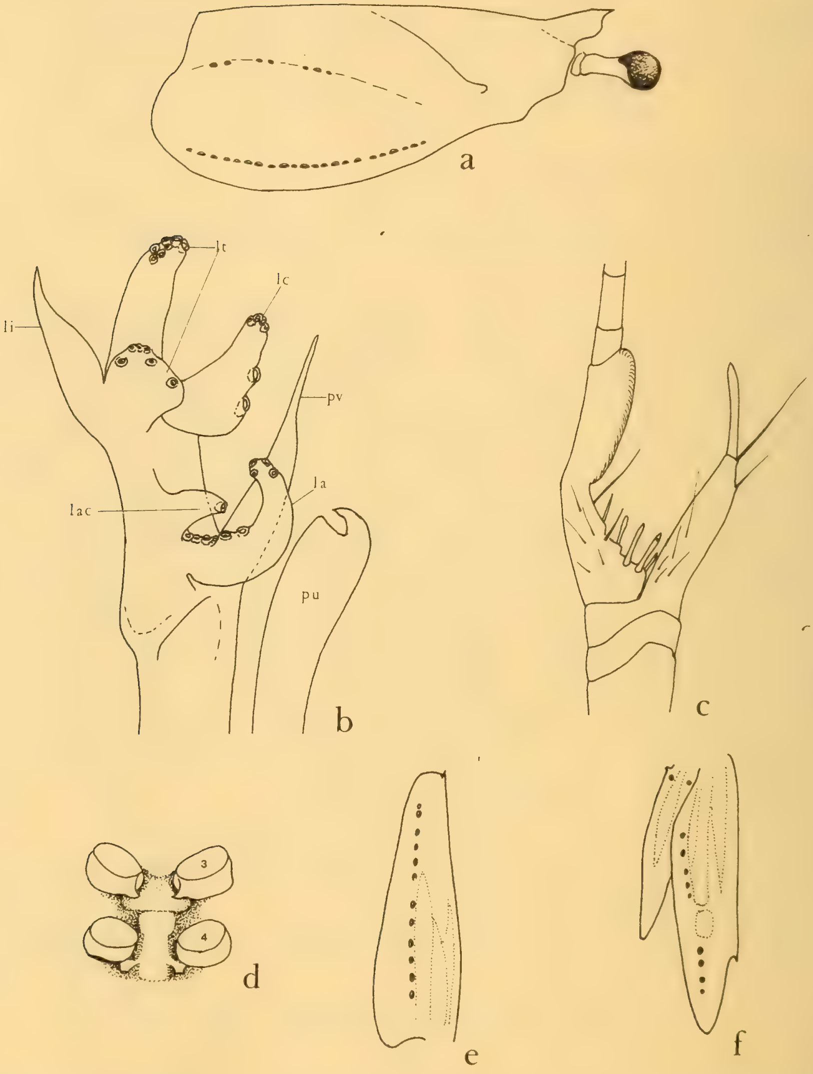

Fig. 20. *Sergestes* (*Sergia*) *prehensilis*
a. Carapace in lateral view; *b.* Petasma; *c.* Outer antennular flagellum male; *d.* Female coxae pereiopod three; *e.* Scaphocerite; *f.* Uropod.

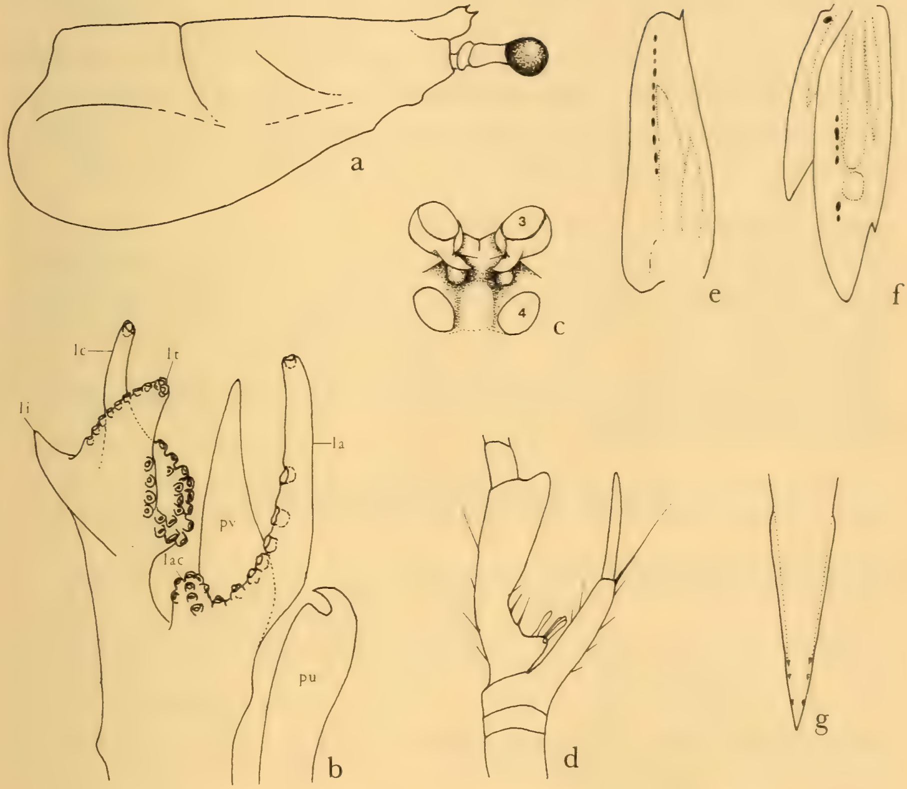

Fig. 21. *Sergestes* (*Sergia*) *regalis*
a. Carapace in lateral view; *b*. Petasma; *c*. Female coxae pereiopod three; *d*. Male outer antennular flagellum; *e*. Scaphocerite; *f*. Uropod; *g*. Telson.

groove well defined. Carapace with row of 18–22 lens-bearing photophores near lower carapace border, five or six in row at upper border of branchial chamber. Sixth abdominal segment ending dorsally in tiny spinule. Telson apically acute. Eye slightly more than half length of basal antennular peduncle segment. Scaphocerite reaching almost to end of third antennular peduncle segment, bearing row of about 12 or 13 photophores. Third maxilliped slender, shorter than pereiopods. Pereiopod five half length of fourth, flattened, two distal segments setose on both margins. Outer margin of exopod uropod with spine at distal third, bearing row of about nine photophores. Coxa pereiopod three in female bearing short broad acute protuberance. Petasma male, with curved lobus armatus, short lobus accessorius at base of latter, lobus inermis tapering, unarmed, apically acute. Lobus terminalis bilobed, outer lobe elongate, with several apical hooks, inner lobe short, blunt. Lobus connectens slightly curved, apically and proximally armed. Processus ventralis apically slender and elongate.

Distribution: Off Japan, off Natal, off Cape.

South African stations: IK7, IK31, IK32, IK33, IK35, IK34, IK36, IK37, IK38, IK41, IK42, IK44, IK45, IK46, IK48, IK51, A315, A317, A318, A321, A1892, A1896, A2945, A2961, A2962, A2963, A2965, A2966, A2968, A3634, A363?, A4218.

Material: Average carapace length for 30 ♂♂: 13·3 mm. Average carapace length for 30 ♀♀: 12·8 mm.

Sergestes (*Sergia*) *regalis* Gordon, 1939

Fig. 21

Sergestes regalis Gordon, 1939: 498, figs 1, 2, 3, 4*a*, *b*, *d*.
Sergestes (*Sergia*) *regalis:* Yaldwyn, 1957: 9. Kensley, 1968: 308, figs 9*b*, 10*a*, 11*a*.

Description: Rostrum apically bifid. Carapace with well-defined post-cervical groove, cervical groove less well defined, dorsally obsolete. Strong supraorbital ridge. Eye two-thirds length of basal antennular peduncle segment. No ocular tubercle. Sixth abdominal segment longer than telson, ending posteriorly in dorsal spinule. Telson bearing three pairs dorso-lateral spinules distally, apically acute. Scaphocerite not quite reaching middle of third antennular peduncle segment bearing row of about 11 opaque-spot photophores. Maxilliped three slender, shorter than pereiopods two or three, reaching end of antennular peduncle, dactylus of six segments, propodus of two. Pereiopods four and five flattened, two distal segments of latter setose on both margins. Coxa pereiopod three female with strong incurved leaf-shaped process. Petasma male with short acute unarmed lobus inermis, lobus terminalis broadly triangular, armed with row of hooks on inner upper edge, shorter than lobus connectens. Latter proximally broad, with numerous large hooks, distally slender, with one large apical hook. Lobus armatus curved, elongate, with small hook-covered lobe at base, slightly longer than unarmed processus ventralis.

Distribution: South Atlantic, 32·45S, 08·47W, off Cape Point.

South African stations: IK35, IK40, IK45, IK48, A2958, A3641, A3643, A363?

Material: Average carapace length for 15 ♂♂: 16·2 mm. Average carapace length for 13 ♀♀: 17·6 mm.

Sergestes (*Sergia*) *scintillans* Burkenroad, 1940

Fig. 22

Sergestes (*Sergia*) *scintillans* Burkenroad, 1940: 43. Yaldwyn, 1957: 9.

Description: Rostrum hardly elevated, apically acute, anterior margin vertical. No supraorbital ridge or spine. Cervical groove dorsally obsolete, laterally more distinct. Post-cervical groove dorsally distinct. Eye reaching middle of basal segment of antennular peduncle. Latter with two distal segments together equal in length to basal segment. Scaphocerite reaching midpoint of third peduncle segment. Maxilliped three slender, not longer or more robust than pereiopods. Outer uropod ramus with spine on outer margin at about distal third. Telson apically acutely rounded. Coxa pereiopod three in female with strong median curved process. Petasma in male with short triangular processus ventralis, less than half length of robust slightly curved lobus armatus. Latter bearing several large hooks plus row of several smaller hooks. Lobus terminalis small bearing two hooks, applied to base of stout lobus connectens. Latter with eight hooks. Lobus inermis broadly, bluntly rounded, unarmed, widely separated from lobus connectens. Lens-bearing photophore pattern as follows:

Eyestalk—with one distal and one proximal photophore on medial surface.
Antennule—third peduncular segment with single disto-ventral photophore.
Antennal scaphocerite—with row of seven widely separated photophores.
Mandible—one distally on basal joint of palp.
Second maxilla—one on exopod base.
First maxilliped—two on exopod, sternite with one at base of each appendage.
Second maxilliped—one at distal end propodus, one at distal and one at proximal end carpus, one at proximal end merus, one at distal end ischium.
  Sternite with one median photophore.
Third maxilliped—one at distal end carpus, one at distal end merus, one at distal end ischium. Sternite with one median photophore one lateral just posterior to appendage.
First pereiopod—one at distal and proximal end carpus, one at proximal end merus. Sternite as for maxilliped three.
Second pereiopod—one at distal end carpus, one at distal and proximal end merus. Sternite as for maxilliped three.
Third pereiopod—similar to second pereiopod.
Fourth pereiopod—similar to second pereiopod.

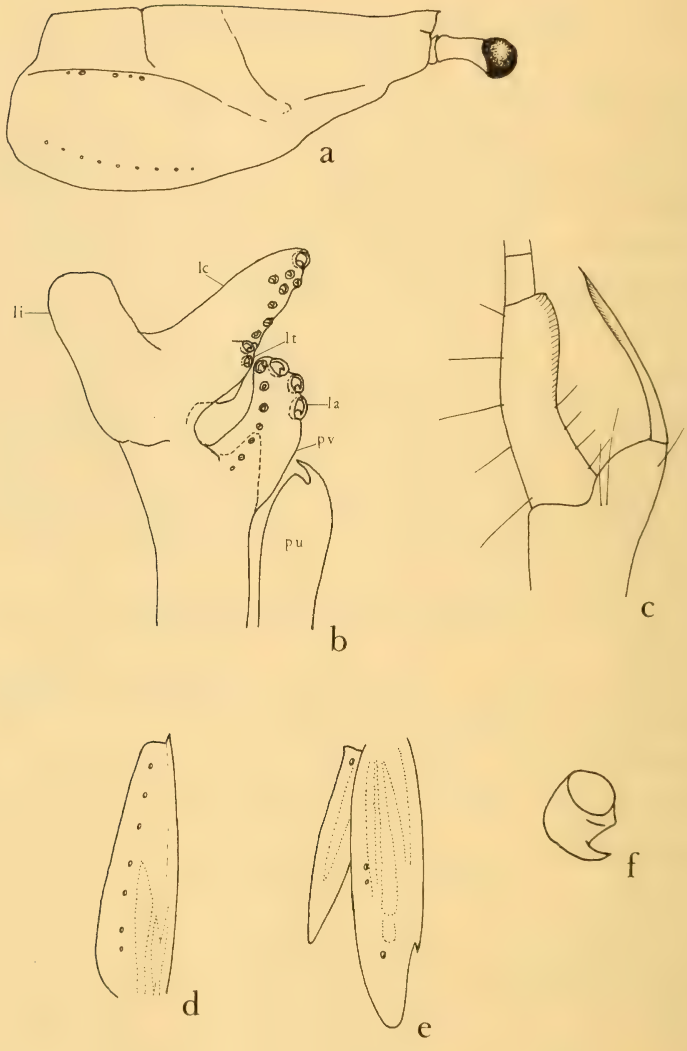

FIG. 22. *Sergestes* (*Sergia*) *scintillans*
a. Carapace in lateral view; *b*. Petasma; *c*. Male outer antennular flagellum; *d*. Scaphocerite; *e*. Uropod; *f*. Female coxa pereiopod three.

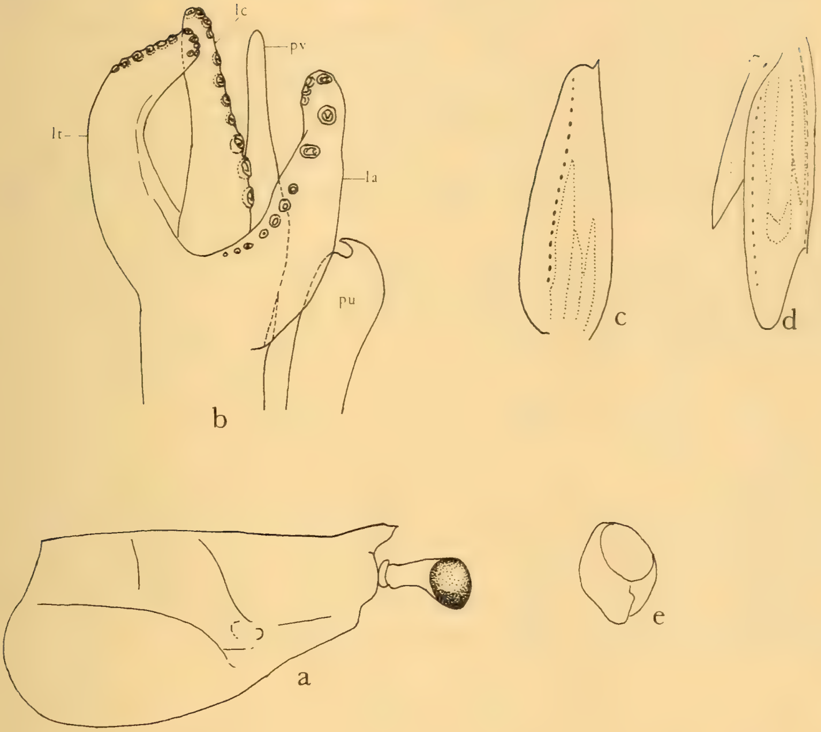

FIG. 23. *Sergestes* (*Sergia*) *splendens*
a. Carapace in lateral view; *b*. Petasma; *c*. Scaphocerite; *d*. Uropod;
e. Female coxa pereiopod three.

Fifth pereiopod—one at distal end merus, one at distal end ischium. Sternite with one median pair posterior to appendages, one lateral posterior to median pair.

Branchiostegite—with row of five minute photophores along suprabranchial ridge, lower portion with row of nine minute photophores.

Pleopods—with single minute photophore on inner distal end protopodite, between endo- and exopod.

First pleon sternite—one postero-median, one antero-lateral to pleopod, one medio-lateral to pleopod.

Second to fourth pleon sternites—one antero-median, one postero-median, one antero-lateral, one medio-lateral to pleopod.

Fifth pleon sternite—one antero-lateral to pleopod.

Sixth pleon sternite—four or five median photophores.

Uropod—protopodite with two on inner margin, outer ramus with three widely separated photophores, inner ramus with two basal photophores.

Distribution: 00·55S, 98·15E. (Off western Sumatra, *Dana* station 3622 1.)

South African stations: IK46, A1896, A2966.

Material: Carapace length (mm)

♂	♀
6·9	6·8
6·8	8·8
5·8	

Remarks: The specimens fit the description given by Burkenroad, especially in the photophores pattern, and also agree with the type material. The only differences are in the branchiostegite photophores, there being 12 in the holotype, nine in the present specimens, and in the fourth pleon sternite which, unlike the holotype, does have two median photophores.

Sergestes (*Sergia*) *splendens* Sund, 1920

Fig. 23

Sergestes splendens Sund, 1920: 14, figs 16–18. Barnard, 1950: 642, fig. 120*k*, *l*. Grindley & Penrith, 1965: 281.

Sergestes (*Sergia*) *splendens:* Yaldwyn, 1957: 9.

Sergestes crassus Hansen, 1922: 98, pl. 5, figs 4*a*–*l*, 1925: 23.

Description: Rostrum ovate, apically acute. No supraorbital spine or ridge. No hepatic spine but a small knob present. Cervical groove dorsally obsolete, laterally defined. Strong post-cervical groove. Eyestalk reaching midpoint of basal antennular peduncle segment, bearing an ocular tubercle at disto-dorsal edge of cornea. Antennular peduncle squat, basal segment longer than second, which in turn is longer than third. Scaphocerite reaching midpoint of latter, bearing row of about 18 opaque spot photophores. Telson apically acute. Uropod exopod with spine on outer margin at distal third, with row of about

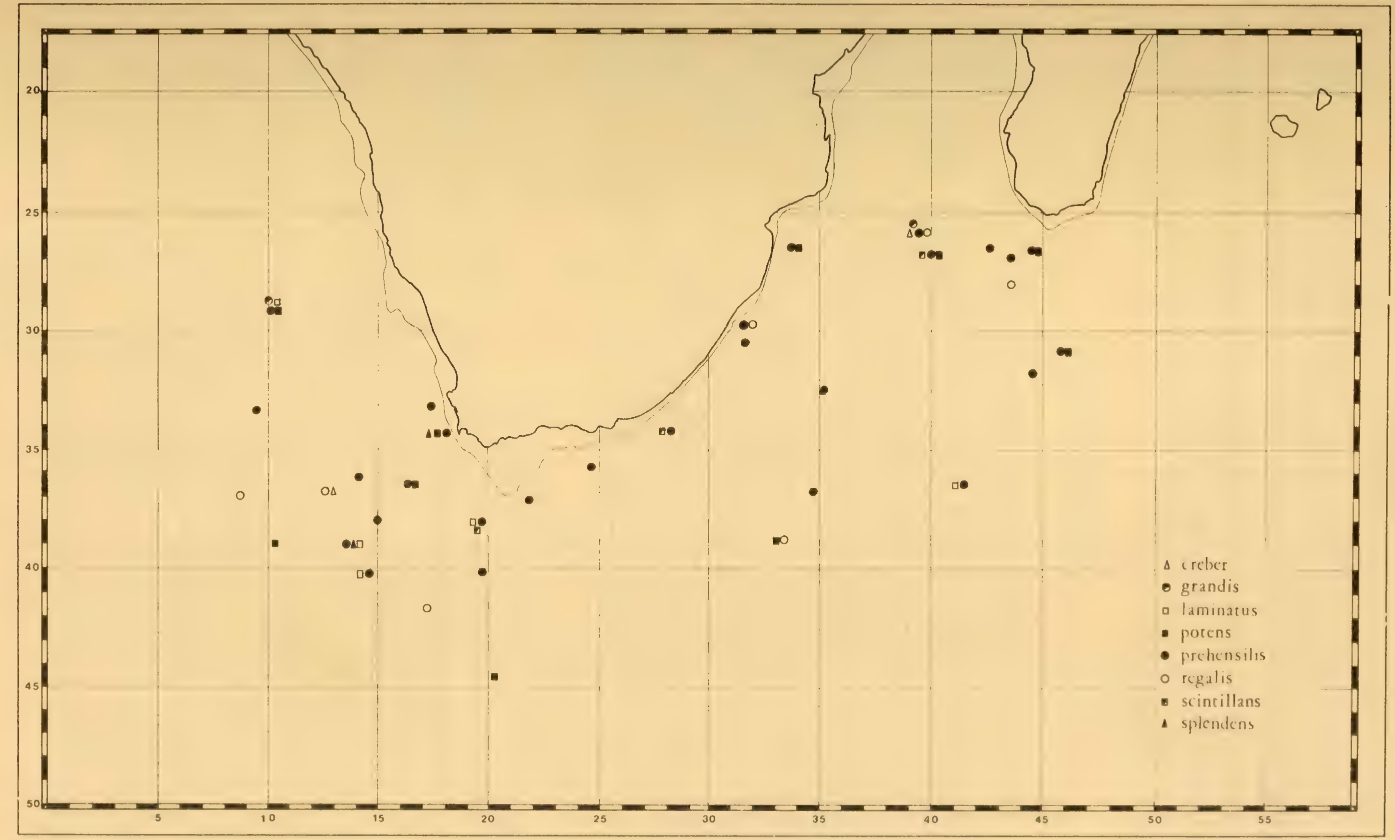

FIG. 24. Map showing distribution of the subgenus *Sergia* around southern Africa

15 minute photophores close to inner margin. Coxa pereiopod three in female with broad rounded median process. Petasma in male with four elongate lobes. Lobus armatus slightly curved, armed with a single row of hooks. Lobus terminalis curved, not reaching as far distally as lobus connectens. Processus ventralis slender, unarmed, equal in length to lobus terminalis.

Distribution: North Atlantic, Mediterranean (off Monaco), off Table Bay.

South African stations: A2962, IK6.

Material: Carapace length (mm)

♂	♀
11·3	10·6

DISCUSSION

Regarding the genus *Lucifer*, it may be seen from the distribution map (Fig. 3) that *L. typus*, the commonest species in South African waters, and here recorded for the first time, occurs both inshore as well as in the very deep offshore oceanic water. *L. penicillifer*, the other common species (and the only species hitherto recorded from South Africa), seems more confined to the inshore waters. A similar situation has been observed off the coast of Florida (Bowman & McCain, 1969) where *L. typus* did not seem to occur inside the 100 fathoms line, whereas *L. faxoni* tended to be absent from the offshore stations. Although the situation obtaining off the southern African coast is not as clear-cut, probably due to a more complex current system, a similar trend is apparent. Of the other two species of *Lucifer* recorded, viz. *L. chacei* and *L. orientalis*, both are new records for the area. *L. orientalis* occurred at both inshore and offshore stations, but only off the east coast, i.e. confined to the warmer Indian Ocean water. *L. chacei* was taken at only two stations, at the southern end of the Moçambique Channel. This is not unexpected as this species is common in the East Indies (Hansen, 1919). Nevertheless, this is the most westerly record of the species, and an extension of the known range by several thousand miles.

With regard to the genus *Sergestes*, it can be seen from the distribution maps (Figs 15, 24) that several species occur which are typical of the oceans either to the west or to the east of the southern African continent. *S. splendens* seems to be limited to the Atlantic and Mediterranean, and has not been taken east of Cape Point. Six species have been recorded from the North Atlantic and are now recorded both from west of Cape Point (South Atlantic) and east of Cape Point (south-west Indian Ocean). These are *S. corniculum*, *atlanticus*, *arcticus*, *armatus*, *sargassi*, *pectinatus*. Two eastern Indian Ocean species, viz. *laminatus* and *scintillans* have their ranges extended by several thousand miles to the south-west Indian Ocean, while *S. creber* from the western Pacific is now recorded from the Moçambique Channel and south-west of Cape Point. *S. disjunctus*, also from the western Pacific, is now recorded from off the west coast.

SUMMARY

The family Sergestidae in the waters around southern Africa is reviewed. Four species of the planktonic genus *Lucifer* are discussed, three of which are new records for the region. Two species of *Acetes* are discussed, while the first record of *Petalidium foliaceum* is made. Eight species of *Sergestes*, subgenus *Sergestes*, are discussed, three of which are new records, while of the eight species of the subgenus *Sergia* discussed, four are new records for the region.

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Finally, my sincere thanks are due to Dr. F. A. Chace, Jr., of the Smithsonian Institution, Washington, D.C., and Dr. J. C. Yaldwyn, of the Dominion Museum, Wellington, New Zealand, for their critical reading of the manuscript, and for supplying many useful suggestions and opinions.

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By
P. A. HULLEY

Cape Town Kaapstad

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By
P. A. Hulley
South African Museum, Cape Town

(With 1 figure and 1 table)

[*Ms. accepted* 5 *July* 1971]

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Introduction

In 1963, a large quantity of interesting elasmobranch material was collected by the Cape Town-based trawler *Arum* and donated to the South African Museum (Hulley & Penrith, 1966). Two specimens (SAM 24029) were preliminarily identified as *Centroscymnus fuscus* Gilchrist & Von Bonde, after comparison with a mounted specimen (SAM 17161) in the collection. Recently, Garrick (1959) pointed out that *Centrophorus squamosus* has a bipolar distribution, so that Smith (1967) suggested its likely occurrence in southern African waters. Re-examination of the material indicates that all three specimens should be refered to *Centrophorus squamosus* (Bonnaterre). They therefore represent the first record of the species in this region. Penrith (1969) identified the preserved specimens as *Lepidorhinus squamosus* but no description was given.

Smith (1967), like Garman (1913), would revive the genus *Lepidorhinus* Bonaparte to include those squalids whose inner corner of the pectoral fin is distinctly angular, but not markedly elongate, and whose dermal denticles are leaf-like rather than plate-like in structure. However, Garrick (1959) has shown that the pectoral extension varies considerably, as do the dermal denticles, and Bigelow & Schroeder (1948, 1953, 1957) suggest that any further subdivision of the genus *Centrophorus* on the basis of any minor character does not serve a useful purpose, since the number of species is small. Furthermore, Smith (1967) considers that *Centrophorus acus*, which Garrick (1959) retains as a separate species solely on the basis of structural differences in the dermal denticles, should be synonymized with *Centrophorus* (*Lepidorhinus*) *squamosus*. Support for the discrimination of *Centrophorus acus* as a separate species is given by the two preserved specimens (SAM 24029) of *Centrophorus squamosus*. These specimens already show the 'adult form' of denticle structure for *Centrophorus squamosus*, while being of a similar size to the holotype of *Centrophorus acus* (total length 819 mm).

Ann. S. Afr. Mus. **57** (11), 1971: 265–270, 1 fig., 1 table.

An interesting point is raised by the mounted specimen (SAM 17161), which was trawled off the west coast of South Africa in 1925. This specimen was identified as *Centroscymnus fuscus* Gilchrist & Von Bonde by Barnard, presumably after comparison with the single type specimen in the collection of the Government Marine Survey. The type is not figured, but Gilchrist & Von Bonde (1924:3) point out that the 'hinder angle [of the pectoral fin is] rounded'. Unfortunately, this type has now been lost and there are no other specimens of this species, but on the basis of the museum specimen, it is considered that *Centroscymnus fuscus* should be synonymized with *Centrophorus squamosus*. This is supported by the fact that Bigelow & Schroeder (1957: 95) point out that 'the relationship of *Centroscymnus fuscus* of southern African waters to other members of the genus remains doubtful'.

The type locality for *Centroscymnus fuscus* given as off Saldanha Bay in 280 fathoms (512 metres) (Smith, 1961) is erroneous. The type was taken at 32°3.00′S, 16°2.00′E (off St Helena Bay) in a depth of 360 fathoms (658 metres) (Gilchrist, 1922:16, 66).

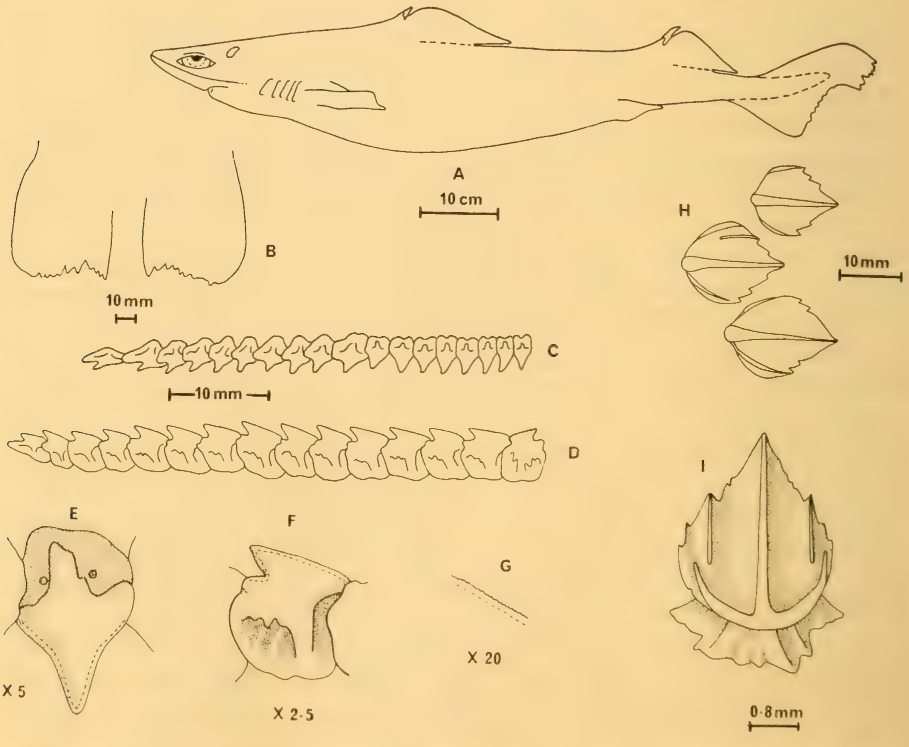

Fig. 1. *Centrophorus squamosus* (SAM 24029). A: lateral view; B: pectoral fins; C: right upper teeth; D: right lower teeth; E: 4th right upper tooth; F: 4th right lower tooth; G: cutting edge of 4th right lower tooth; H: dermal denticles from level of 1st dorsal fin; I: dorsal view of denticle showing multi-angl ed base.

The South African specimens of *Centrophorus squamosus* appear to be comparatively broader at their pectoral origin than either the New Zealand or North Atlantic specimens. However, the proportional dimensions, tooth arrangement and dermal denticle structure agree very closely.

DESCRIPTION OF MATERIAL

Centrophorus squamosus (Bonnaterre, 1788)

Squalus squamosus Bonnaterre, 1788: 12.
Lepidorhinus squamosus Bonaparte, 1838: 207. Garman, 1913: 211. Fowler, 1936: 78, fig. 25. Smith, 1967: 119. Penrith 1969: 64.
Centrophorus squamosus Müller & Henle, 1841: 90, pl. 34. Bigelow & Schroeder, 1948: 451; 1957: 83. Garrick, 1959: 135, figs 2–5. Wheeler, 1969: 65.
Centroscymnus fuscus Gilchrist & Von Bonde, 1924: 2. Barnard, 1925: 51. Smith, 1961: 58.

Material

Two males, SAM 24029 (total lengths 920, 934 mm), trawled west of Cape Peninsula in 300 fathoms (548 metres), and one female, SAM 17161 (mounted; total length 1 364 mm), trawled off the west coast, but purchased Cape Town Pier.

Distribution

Eastern North Atlantic, Azores, Madeira, Australasia.

TABLE 1. *Centrophorus squamosus*. Measurements expressed as percentage of the total length.

	SAM 24029 ♂	SAM 24029 ♂	SAM 17161 ♀	Garrick (1959) range
Total length	934 mm	920 mm	1 364 mm	
Trunk at pectoral origin: breadth	13,9	14,2	13,0	12,6–13,4
height	12,4	12,3	12,0	9,7–12,4
Snout length in front of:				
outer nostrils	2,8	2,3	2,9	2,7– 3,8
mouth	8,8	8,2	7,2	8,1–11,4
Eye: horizontal diameter	4,2	4,4	—	4,2– 8,7
Mouth: breadth	7,7	7,4	7,7	7,4– 9,8
Nostrils: distance between inner corners	3,0	2,8	3,4	2,8– 4,0
Preoral clefts: distance between inner corners	6,3	6,8	6,6	5,8– 7,6
Gill slit lengths: 1st	2,2	2,5	2,2	2,0– 2,3
3rd	2,6	3,3	2,5	—
5th	3,1	3,1	3,0	2,0– 3,0
1st dorsal fin: vertical height	4,7	4,7	3,9	3,7– 5,4
base length from origin of spine	9,7	9,5	8,8	6,6– 9,9
2nd dorsal fin: vertical height	5,0	5,1	4,7	4,0– 7,1
base length from origin of spine	7,6	7,1	6,3	6,1– 8,4
Caudal fin: upper margin	17,4	19,0	15,2	15,6–21,4
lower margin	12,7	12,6	10,8	9,3–11,7
Pectoral fin: anterior margin length	9,8	11,5	8,9	9,8–11,9
Pelvic fin: anterior margin length	5,9	7,2	5,2	4,9– 7,6

	SAM 24029 ♂	SAM 24029 ♂	SAM 17161 ♀	Garrick (1959) range
Distance from snout to: eye	4,9	5,0	4,8	3,9– 6,2
1st gill slit	16,9	17,4	16,3	16,8–21,9
5th gill slit	21,0	21,7	20,2	19,8–25,5
1st dorsal spine	34,2	36,0	36,4	35,7–39,2
2nd dorsal spine	67,8	70,0	74,1	67,0–74,3
upper caudal	82,9	82,7	85,3	78,9–86,0
pectoral	21,4	22,1	20,7	20,3–25,4
pelvic	60,3	62,0	64,4	55,8–65,0
Interspace between:				
1st dorsal base—2nd dorsal spine	26,8	25,5	29,0	23,2–27,4
2nd dorsal base—upper caudal	6,5	5,7	4,9	5,5– 6,5
pelvic—subcaudal	13,4	14,0	14,4	10,5–14,0
Distance origin to origin of:				
pectoral/pelvic	39,5	40,2	45,5	33,0–44,8
pelvic/subcaudal	18,7	18,7	20,7	16,6–18,3

Description

Figures given in parentheses refer to the mounted specimen (SAM 17161).

Body fusiform, its height at level of first dorsal 5,8–6,3 (6,1) in length to origin of caudal; its length to cloaca 63–65% (69%) of total length; caudal peduncle strongly compressed, without lateral keels or precaudal pits. Height of trunk at level of pectoral fins 6,7 (7,1) in length to origin of caudal.

Dermal denticles large, more close-set and overlapping in larger females than in males, covering the whole of the body except for naked area on lower lip and axils of paired fins. Each denticle of trunk region with subovoid blade on slender pedicel, rising from multi-angled base. Blade with high median ridge extending to median tooth, with a smaller lateral ridge on each side, extending to lateral tooth.

Head depressed and wedge-shaped, its length to first gill slit 5,8–5,9 (6,1) in total length; interorbit 3,5–3,8 in head length. Snout short, depressed, with noticeable lateral edge, its length in front of orbit 3,4–3,5 (3,4) in head, its length in front of mouth 2,9 (2,1) times the distance between inner edges of nostrils. Eyes large, oval, 2,0–2,4 times as long as high; horizontal diameter of eye 4,0–4,1 in head length. Spiracle large, situated above level of longitudinal axis of eye, and posterior to it by a distance of 0,4 times the length of the orbit. Gill slits vertical, increasing in size from 1st to 5th. Nostrils slightly oblique, their outer ends posterior to tip of snout by a distance 0,5–0,7 times as long as eye; nostrils divided by anterior and posterior nasal flaps into two apertures. Mouth moderately arched and broad, its width 1,1 (0,9) in preoral length. Preoral clefts short, extending inward 0,3–0,4 the distance from corners of mouth to upper symphysis; interspace between clefts 1,1–1,2 (1,2) in mouth width.

Teeth in males $\frac{16-1-17}{13-1-14}$, $\frac{16-1-16}{14-1-14}$, in female $\frac{17-1-17}{14-1-14}$, dissimilar in the two jaws. Upper teeth erect and triangular in centre of jaw, but oblique towards outer angle; teeth in median and outer regions somewhat shorter; three rows of teeth functional. Lower teeth blade-like, with quadrangular bases and oblique cusps; each cusp notched laterally and with finely serrate cutting edge; two rows of teeth functional.

First dorsal with long base, originating smoothly from dorsal profile, a little anterior to level of pectoral when latter is pressed to sides of trunk. Height of first dorsal 2,0–2,1 (2,3) in length of dorsal base, measured from origin of spine to posterior insertion of base. First dorsal spine short, its exposed length 3,1–3,3 (3,5) in height of first dorsal and its origin about half-way along anterior margin of fin. Apex of first dorsal rounded, distal margin weakly concave.

Second dorsal similar to first, but with shorter base; its length from origin of spine to posterior insertion 1,3 (1,4) in similar length of first dorsal. Second dorsal spine longer than first.

Caudal measured from hypural origin 7,7–7,8 (9,3) in total length; the epiural lobe moderately developed, hypural lobe deep, terminal lobe truncate and separated from hypural by distinct subterminal notch. Origin of hypural anterior to epiural.

Pectorals 1,6–1,7 (1,4) times as long as broad, and originating just posterior to 5th gill slit; length of pectorals 1,5–1,7 (2,0) in head, so when adpressed to sides of body fail to reach origin of first dorsal spine. Anterior margin of pectorals straight proximally but rounded distally. Posterior pectoral angle slightly extended as a pointed tip.

Pelvics originating well posterior to posterior end of first dorsal base. Anterior pelvic margin straight, apex sharply rounded, posterior free tip pointed and terminating below level of origin of second dorsal spine.

Colour

Uniformly dark grey.

SUMMARY

Three squalid sharks, trawled off the west coast of South Africa, are identified as *Centrophorus squamosus* (Bonnaterre). They represent the first record of the species in the eastern South Atlantic. *Centroscymnus fuscus* Gilchrist & Von Bonde is synonymized with *Centrophorus squamosus*.

ACKNOWLEDGEMENTS

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By

BRIAN KENSLEY

Cape Town Kaapstad

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By
Brian Kensley

South African Museum, Cape Town

(With 13 figures)

[*MS. accepted* 26 *May* 1971]

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Introduction

Since 1881, when Bate described his new genus *Gennadas* with *G. parvus* as the type species, several more species have been described. It was found that superficially the species were very similar, carapace and appendage characteristics being of little specific use. As it is also sometimes difficult to associate males and females of the same species, a great confusion and proliferation of species occurred. It has since been recognized that the male petasma of the 1st pleopods and the female thelycum formed by the last 3 thoracic sternites, provide the best diagnostic characters for the separation of the species. Burkenroad (1936) improved the knowledge of the genus by carefully describing and figuring the thelyca of several species while Tirmizi (1960) has also described and figured several species.

Barnard (1950) recorded 7 species from the South African region, while *G. bouvieri* and *G. clavicarpus* (as *G. propinquus*) were later added (Kensley 1968, 1969). The present collection includes 11 species, 4 of which are new records for the region, but does not include *G. talismani* and *G. elegans*, which have been recorded from the South Atlantic. As the genus constitutes an important part of the mesopelagic fauna of the waters around South Africa, it was felt that brief descriptions and figures of all the species involved would aid future identifications. Emphasis has been placed on the petasmae and the thelyca, being the best diagnostic characters.

The material of the present collection comes from several sources: the Division of Sea Fisheries (stations denoted by 'A' followed by 4 digits); the deep sea trawls off Cape Point (stations denoted by 'A' followed by 3 digits); the South African Museum bathypelagic survey (stations denoted by 'IK'), and one sample from the University of Cape Town ecological collection.

Ann. S. Afr. Mus. **57** (12), 1971: 271–294, 13 figs.

Systematic Discussion

Genus GENNADAS

(See Fig. 6)

Rostrum short, unidentate. 2nd and 3rd peduncle segments of 1st antenna expanded. Vestigial arthrobranch present on 1st maxilliped. No podobranchs present behind 2nd maxilliped. Exopod of 1st maxilliped without distal segmented prolongation. Only 6th abdominal segment dorsally carinate. Telson apically truncate, with single pair of mobile lateral spines. Petasma in male with distal margin of 3 lobes, viz. external, median and internal, accessory lobe always present. (See Barnard 1950, fig. 118, for terminology.) Appendix masculina of 2nd pleopod of male bilamellate. Thoracic sternites 6 to 8 (i.e. ventral surfaces between pereiopods 3 to 5) in female variously modified to form thelycum.

List of species from southern African waters

Gennadas bouvieri Kemp
**Gennadas brevirostris* Bouvier
Gennadas capensis Calman
Gennadas clavicarpus De Man
Gennadas gilchristi Calman
**Gennadas incertus* (Balss)
Gennadas kempi Stebbing
**Gennadas parvus* Bate
Gennadas scutatus Bouvier
**Gennadas tinayrei* Bouvier
Gennadas valens (Smith)

* New record

Key to South African species of Gennadas (*adult females*)

1.	Posteriorly directed tongue-like process on 5th thoracic sternite . . .	*tinayrei*
—	No tongue-like projection of 5th sternite	2
2.	Shield on 8th thoracic sternite with 2 anteriorly-directed projections . .	*bouvieri*
—	Shield on 8th thoracic sternite absent, or if present, lacking separated, anteriorly directed lateral projections	3
3.	Shield of 8th thoracic sternite with anterior flap reaching 6th sternite . .	*scutatus*
—	Shield of 8th thoracic sternite not reaching 6th sternite	4
4.	7th sternite with 2 anteriorly-directed projections	5
—	7th thoracic sternite lacking 2 projections	6
5.	Projections of 7th sternite apically simple	*valens*
—	Projections of 7th sternite apically notched	*gilchristi*
6.	Leaf-like process arising in front of 4th pereiopods, medially directed . .	*parvus*
—	No leaf-like projections in front of 4th pereiopods	7
7.	Shield present on 8th thoracic sternite, posteriorly notched	8
—	Shield absent on 8th thoracic sternite, or if present, not posteriorly notched .	10
8.	Shield on 8th thoracic sternite anteriorly rounded	*brevirostris*
—	Shield on 8th thoracic sternite anteriorly emarginate or notched . . .	9

9. Large concave depression on 6th thoracic sternite . . . . . . *incertus*
— No large concave depression on 6th thoracic sternite but broadly rectangular shield on 7th thoracic sternite . . . . *talismani*
10. 6th thoracic sternite with triangular/subtriangular/truncated triangular shield with anteriorly directed apex 11
— 6th thoracic sternite lacking shield, or with subcircular shield . . . 12
11. 7th sternite with W-shaped process . . . . *clavicarpus*
— 7th sternite with rectangular process . . . . *kempi*
12. 6th sternite with W-shaped process, no obvious shield on 8th sternite . . *capensis*
— 6th sternite without W-shaped process, pentagonal shield on 8th sternite . *elegans*

Key to the South African species of Gennadas (*based on petasmal characters of adult males*

1. Median lobe undivided 2
— Median lobe divided 5
2. External lobe divided, division indicated by widely separated (*elegans*) or closely approximate (*tinayrei*) blunt lobules 3
— External lobe undivided or with small acute process on median margin . . 4
3. Median lobe broadly convex . . . . *tinayrei*
— Median lobe low, narrow . . . . *elegans*
4. Accessory lobe bipartite . . . . *capensis*
— Accessory lobe a single flap . . . . *kempi*
5. External lobe undivided . . . . *brevirostris*
— External lobe divided 6
6. Lobules of external lobe elongate, subequal, slender . . . . . . *incertus*
— Lobules of external lobe not elongate, subequal, slender 7
7. Lobules of median lobe hooked . . . . *bouvieri*
— Lobules of median lobe not hooked 8
8. Accessory lobe a mere ridge . . . . *parvus*
— Accessory lobe well developed 9
9. External lobule of median lobe slender 10
— External lobule of median lobe not slender 11
10. Apex of internal lobe acute . . . . *gilchristi*
— Apex of internal lobe rounded 12
11. Inner lobule of median lobe slender . . . . *talismans*
— Inner lobule of median lobe blunt . . . . *valens*
12. Inner lobule of median lobe apically acute . . . . *clavicarpus*
— Inner lobule of median lobe apically truncate . . . . . . *scutatus*

Gennadas bouvieri Kemp, 1909

Fig. 1

Gennadas bouvieri Kemp, 1909: 726, pl. 74, figs 1–4, pl. 75, figs 6, 7; 1910*a*: 179. Burkenroad, 1936: 80. Tirmizi, 1960: 360, figs 40d, 48e, 70–75. Kensley, 1968: 302.
Gennadas alcocki Kemp, 1910*a*: 174, pl. 13, figs 5, 6.
Amalopenaeus bouvieri: Balss, 1927: 267.
Amalopenaeus alcocki: Balss, 1927: 266, fig. 30.

Description

Antennal angle acute, infra-antennal angle quadrate. Spine on outer scaphocerite margin reaching slightly beyond apex of scale. Thelycum of female with shield on 8th thoracic sternite bearing elongate process on antero-lateral corners. 7th thoracic sternite with rounded flap opening posteriorly, attached anteriorly to shield of 6th segment, with small lateral process on either side. Petasma in male with external lobe bipartite, both lobules apically acute. Median lobe broad, with broad distal notch, two lobules thus formed both apically acute. Internal lobe low, with numerous hooks. Accessory lobe large, leaf-shaped.

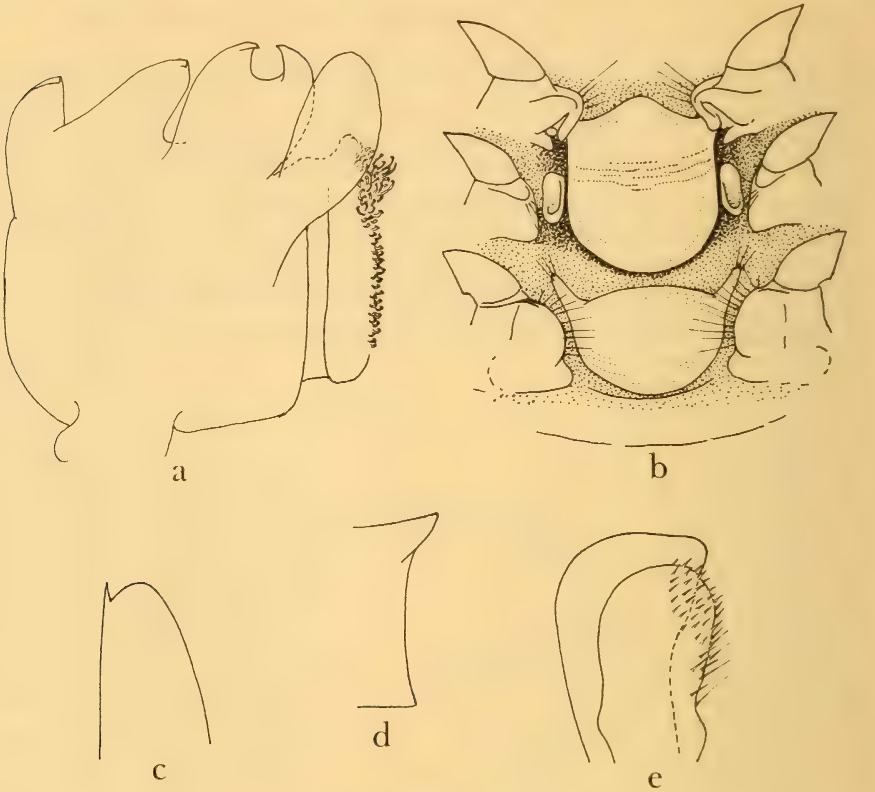

Fig. 1. *Gennadas bouvieri*

a. Petasma. b. Thelycum. c. Apex of scaphocerite. d. Antennal and infra-antennal angles. e. Appendix masculina.

Distribution

Indo-Pacific, South Atlantic, Caribbean, Bermudas, Bahamas.

Material

Station	*Position*	*Depth (metres)*	*C.L.♂ (mm)*	*C.L.♀ (mm)*
IK34	26.30 S, 42.40 E	500	7,8	7,5
			8,0	
			8,4	
IK35	25.55 S, 39.30 E	500	9,0	7,0
IK45	27.00 S, 43.30 E	500		6,0
IK46	26.40 S, 40.00 E	500	5,4	6,5
				7,5
				7,9
				8,1

Station	*Position*	*Depth (metres)*	*C.L.♂ (mm)*	*C.L.♀ (mm)*
A321 . .	34.33 S, 16.42 E	3 200–3 400		8,1
A1892 . .	36.28 S, 41.22 E	1 000		6,6
A3616 .	31.19 S, 10.08 E	250	8,0	8,0
			8,1	8,9

Gennadas brevirostris Bouvier, 1905

Fig. 2

Gennadas brevirostris Bouvier, 1905: 748. Tirmizi, 1960: 341. Crosnier & Forest, 1969: 549.
Gennadas similis Stephensen, 1923: 12, fig. 1.
Gennadas chiasmifera Stephensen, 1923: 13, figs 2, 3.
Amalopenaeus similis: Balss, 1927: 256, figs 8–10, pl. 6, fig. 2.

Description

Antennal angle acute, infra-antennal angle quadrate. Spine on outer scaphocerite margin almost reaching apex of scale. Thelycum of female with

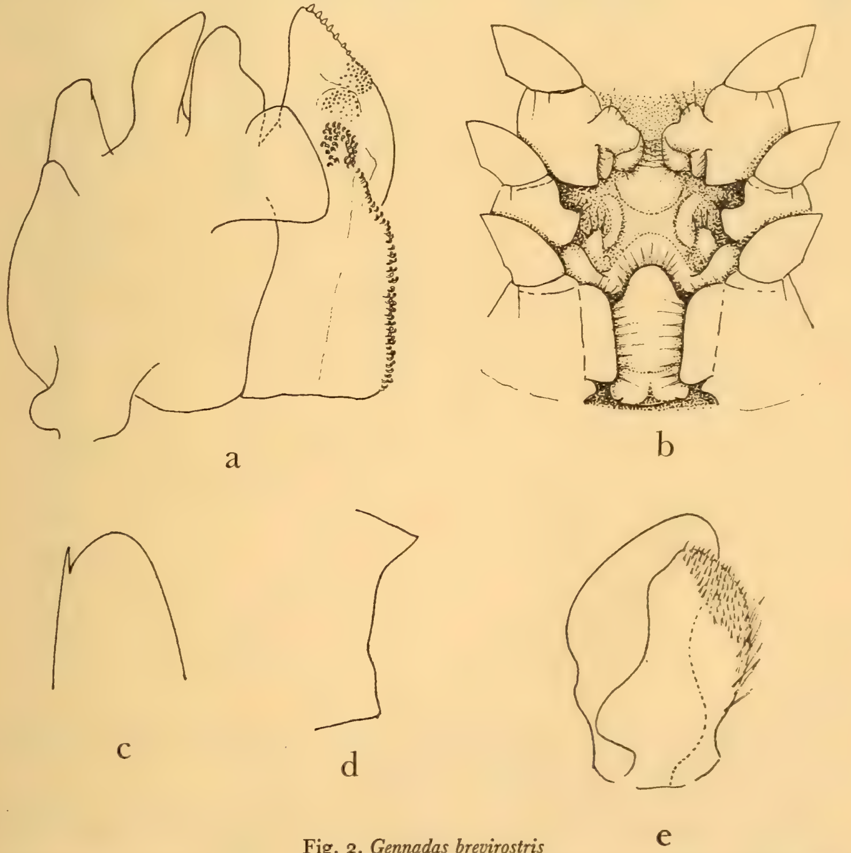

Fig. 2. *Gennadas brevirostris*
a. Petasma. b. Thelycum. c. Apex of scaphocerite. d. Antennal and infra-antennal angles. e. Appendix masculina.

8th thoracic sternite bearing anteriorly rounded setose flap, coxa medially produced into rectangular process. 7th thoracic sternite with W-shaped raised portion posteriorly, coxa with short quadrate lobe. Coxa of 3rd pereiopod produced into large lobed setose process. Petasma in male with external lobe apically blunt, with small lobe at base, median lobe of 2 irregular, somewhat elongate closely-applied lobules, internal lobe roughly triangular, bearing row of peg-like spines on disto-medial edge, and many small hooks arranged in two patches. Accessory lobe a simple flap with rounded corners.

Distribution

North Atlantic, Gulf of Guinea, off Congo and Angola, Cape Basin off west coast of South Africa.

Material

Station	*Position*	*Depth (metres)*	*C.L.♂ (mm)*	*C.L.♀ (mm)*
IK6	34 S, 17 E	200	10,0	11,1
			10,8	11,0
			10,0	11,5
			8,9	11,2
			8,0	10,6
			10,2	10,0
			11,0	9,3
				11,0
				10,6
				9,9
				11,0
				10,9
				12,5
				11,0
				10,8
				8,7
				8,8
				8,6
				9,0
				9,1
A3541	37.00 S, 08.40 E	S	9,5	

Remarks

From previous records and from the present stations, it would seem that this species is limited to the Atlantic Ocean.

An interesting specimen from station IK6 deserves comment. Although possessing a perfect, matured thelycum and having eggs visible in the ovaries, the first pleopods bear a petasma, which although smaller than that of a mature male, is nevertheless unmistakably that of *G. brevirostris*.

Gennadas capensis Calman, 1925

Fig. 3

Gennadas capensis Calman, 1925: 5, pl. 1, figs 1, 2. Burkenroad, 1936: 67, figs 51, 53. Barnard, 1950: 630, fig. 118e, f.

Description

Antennal angle acute, infra-antennal angle quadrate. Spine on outer margin of scaphocerite some distance from apex. Thelycum of female with 7th sternite bearing W-shaped process, median apex of which formed by rounded concave process. Coxa of 5th pereiopod medially expanded, bilobed. Coxa of 4th pereiopod with slender, elongate process. Coxa of 3rd pereiopod bluntly lobed, coxa of 2nd bearing concave spoon-shaped process, posteriorly directed. Petasma of male with external lobe bearing small acute lobe on median margin, medina lobe truncate, internal lobe consisting of 2 hook-covered blunt lobules. Accessory lobe bipartite, consisting of inner club-shaped process and outer broad truncate process.

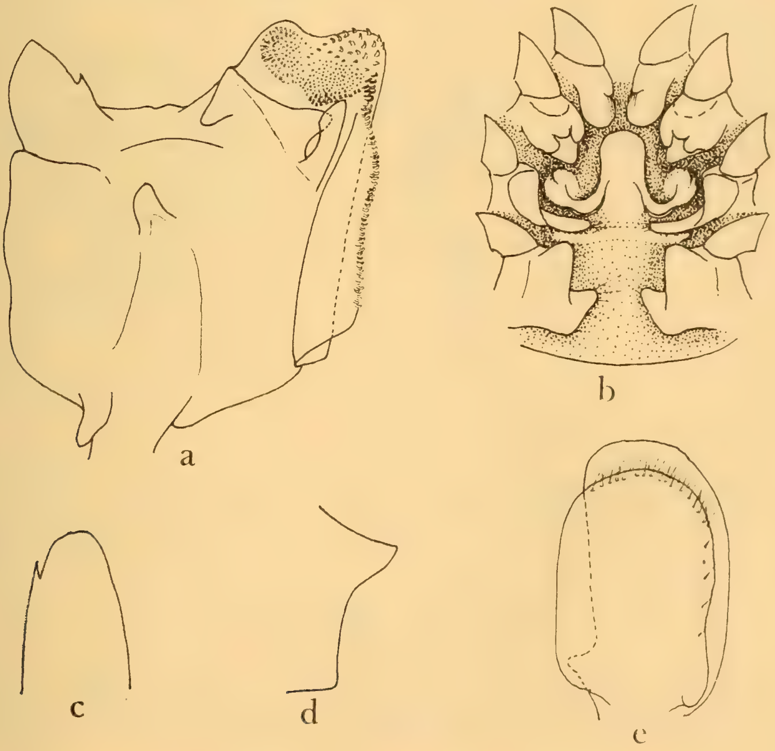

Fig. 3. *Gennadas capensis*
a. Petasma. **b.** Thelycum. c. Apex of scaphocerite. d. Antennal and infra-antennal angles. e. Appendix masculina.

Distribution

Off Cape Point, Bahamas, Bermudas, Gulf of Mexico.

Material

Station	*Position*	*Depth (metres)*	*C.L.♂ (mm)*	*C.L.♀ (mm)*
A1896 . .	34.12 S, 28.24 E	1 000		9,6
A3616 . .	31.19 S, 10.08 E	250	7,9	
			10,6	
			11,0	
			12,5	

Gennadas clavicarpus De Man, 1907

Fig. 4

Gennadas clavicarpus De Man, 1907: 144. Tirmizi, 1960: 358, figs 40c, 48e, 58–66.
Amalopenaeus clavicarpus: Balss, 1927: 267.
Gennadas propinquus (*non* Rathbun) Burkenroad, 1936: 66, 83–85. Kensley, 1969: 167, fig. 9.
Gennadas scutatus (*non* Bouvier) Kemp, 1910*a*: 178, pl. 13, figs 9, 10.
Gennadas scutatus indicus Balss, 1927: 259, fig. 13.

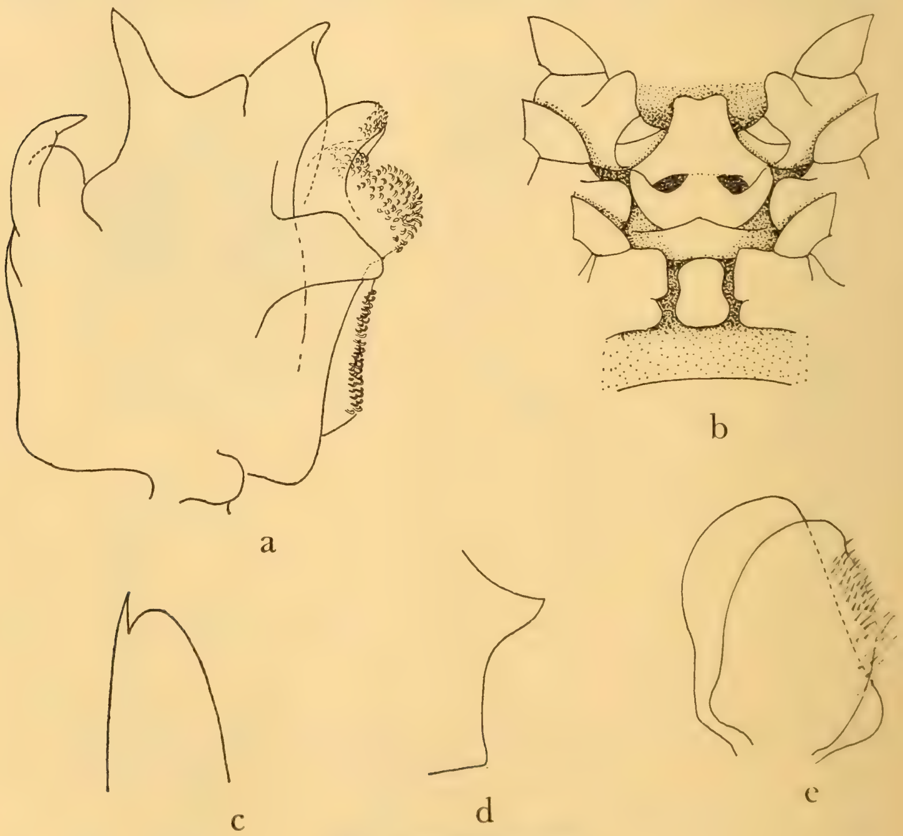

Fig. 4. *Gennadas clavicarpus*

a. Petasma. b. Thelycum. c. Apex of scaphocerite. d. Antennal and infra-antennal angles. e. Appendix masculina.

Description

Antennal angle acute, infra-antennal angle quadrate. Spine on outer margin of scaphocerite reaching beyond apex of scale. Thelycum of female with 8-shaped shield on 8th thoracic sternite, coxa with large lobe. 7th thoracic sternite with W-shaped process, closely connected to triangular shield of 6th thoracic sternite. Openings of seminal receptacles at base of triangular shield. Coxa of 3rd pereiopod with large lobed process. Petasma of male, external lobe bipartite, outer lobule acute, slender, inner lobule rounded. Median lobe large, bipartite, both lobules apically acute. Internal lobe bipartite, both rounded, bearing hooks. Accessory lobe a simple flap.

Distribution

Widespread throughout the Indo-Pacific region.

Material

Station	*Position*	*Depth (metres)*	*C.L.♂ (mm)*	*C.L.♀ (mm)*
IK6	34 S, 17 E	200	7,1	6,9
IK35	25.55 S, 39.30 E	500	7,5	7,9
			6,2	6,5
				6,3
IK36	26.30 S, 33.40 E	500		7,3
A321	34.33 S, 16.42 E	3 200–3 400		7,8
				7,9
A2387	37.36 S, 19.34 E	800	6,9	
A2945	36.11 S, 14.14 E	700	6,3	6,8
A2958	41.40 S, 17.17 E	600		7,1
A3616	31.19 S, 10.08 E	250		7,9
				7,2
A3641	37.00 S, 08.40 E	S	7,8	6,4
			7,5	
A3643	36.51 S, 12.43 E	250		7,9

Remarks

Of the present records, 3 stations are in the area of the Cape Basin, i.e. off the west coast of South Africa, and seem to be the first record of the species from the Atlantic Ocean.

Gennadas elegans (Smith, 1882)

Fig. 5

Amalopenaeus elegans Smith, 1882: 87, pl. 14, figs 8–14, pl. 15, figs 1–5. Kemp, 1910*b*: 14, pl. 1. Lenz & Strunck, 1914: 310. Balss, 1927: 253, fig. 3.

Gennadas elegans: Burkenroad, 1936: 71, fig. 55. Barnard, 1950: 631, fig. 118m, n.

Description

Antennal angle acute, infra-antennal angle blunt. Thelycum of female with pentagonal shield on 8th thoracic sternite. 7th sternite with roughly oval shield posteriorly; anterior portion with dumb-bell-shaped shield bearing seminal receptacles at ends. Petasma in male with small rounded lobe at base of external lobe. Latter broad, divided, division indicated by blunt projection at each end. Median lobe lower than external lobe, narrow, rounded. Internal lobe large, apically evenly convex. Accessory lobe a leaf-like flap.

Distribution

Mediterranean, North and South Atlantic, not as yet known from southern African waters.

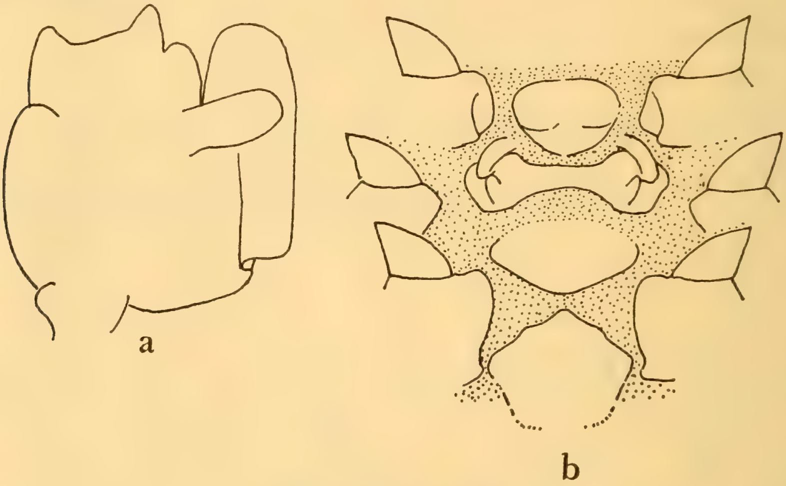

Fig. 5. *Gennadas elegans*
a. Petasma (after Smith, 1882). b. Thelycum (after Burkenroad, 1936).

Gennadas gilchristi Calman, 1925
Fig. 6

Gennadas gilchristi Calman, 1925: 6, pl. 1, figs 3, 4. Burkenroad, 1936: 66, fig. 58. Barnard, 1950: 633, fig. 118 g, h. Kensley, 1968: 301.
Amalopenaeus gilchristi: Balss, 1927: 261, figs. 16, 17.
Amalopenaeus elegans (*non* Smith) Stebbing 1917: 31.

Description

Antennal and infra-antennal angles produced, but apically rounded. Spine on outer margin of scaphocerite hardly reaching apex. Coxa of 3rd pereiopod expanded, more noticeably prominent and bilobed in female than in male. Thelycum of female easily distinguished by bilobed sternal process of 7th thoracic sternite. Petasma of male with external lobe acute, with smaller lobe at its base, median lobe of 2 diverging slender lobules, internal lobe acute, accessory lobe broadly rounded, not extending beyond internal lobe.

Distribution

Off Cape Peninsula, off west coast of South Africa, Agulhas Basin, southern Indian Ocean.

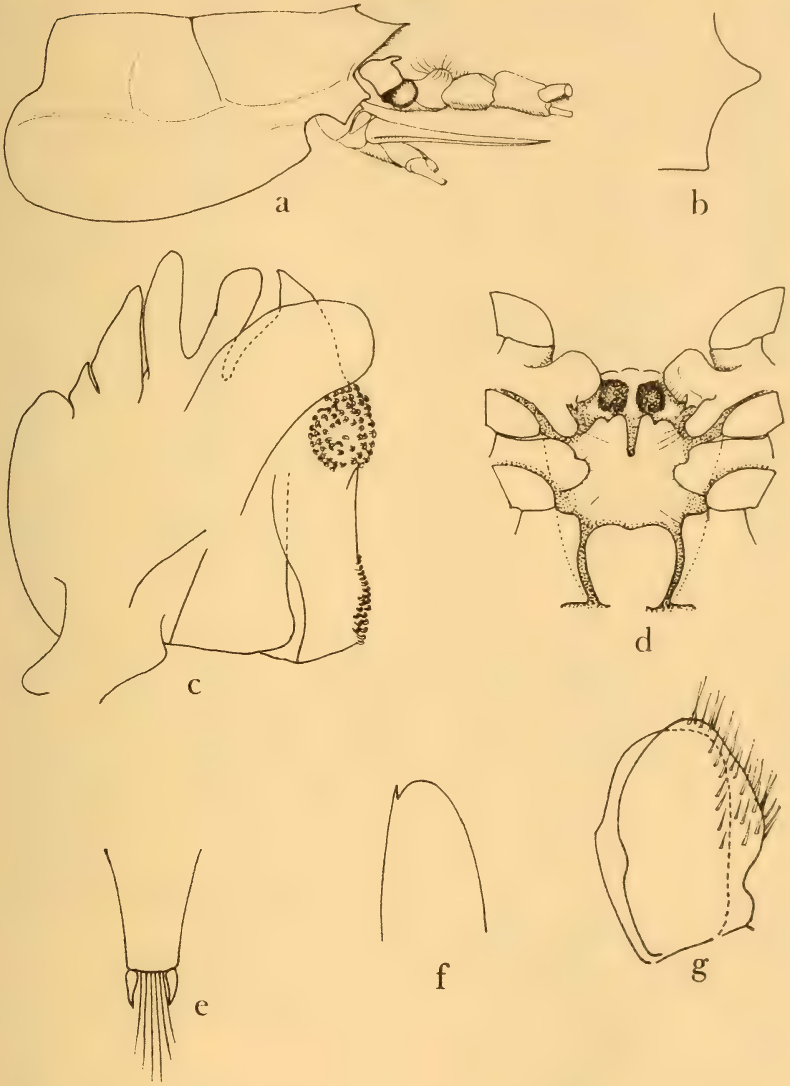

Fig. 6. *Gennadas gilchristi*

a. Carapace in lateral view. b. Antennal and infra-antennal angle. c. Petasma. d. Thelycum. e. Apex of telson. f. Apex of scaphocerite. g. Appendix masculina.

Material

Station	*Position*	*Depth (metres)*	*C.L.♂ (mm)*	*C.L.♀ (mm)*
IK6 . .	34 S, 17 E	200		6,6
				5,3

Station	*Position*	*Depth (metres)*	*C.L.♂ (mm)*	*C.L.♀ (mm)*
IK35	25.55 S, 39.30 E	500	4,8	5,0
			5,2	5,5
			4,9	
			DD	
			6,9	
			5,6	
			6,0	
			5,8	
			5,8	
IK40	38.50 S, 33.08 E	500	6,0	
IK39	37.40 S, 22.59 E		5,8	5,8
			6,2	6,0
			6,2	8,6
			6,2	7,0
			6,9	6,0
			6,9	5,8
				7,0
				6,8
				7,7
				8,0
A321	34.33 S, 16.42 E	3 200–3 400		6,5
A1877	40.44 S, 33.36 E	500	7,0	6,1
A1879	43.29 S, 35.14 E	500	7,4	
A1892	36.28 S, 41.22 E	1 000	5,6	6,0
			7,0	6,3
				6,1
				5,0
				5,0
				4,5
A1894	36.02 S, 35.38 E	500	D	D
A1896	34.12 S, 28.24 E	1 000	4,8	
			4,8	
A2387	37.36 S, 19.34 E	800		5,0
				4,2
A2389	39.40 S, 20.00 E	800	D	D
A2394	44.40 S, 26.05 E	S	5,9	8,0
				7,0
				6,1
				5,4
				7,5
A2945	36.11 S, 14.14 E	700	5,1	6,1
				5,8
A2958	41.40 S, 17.17 E	600	6,4	
			6,8	

Station	*Position*	*Depth (metres)*	*C.L.♂ (mm)*	*C.L.♀ (mm)*
A2961	40.12 S, 14.41 E	700		6,0
				5,9
				5,6
				4,3
A2962	39.06 S, 13.34 E	600	7,1	8,1
				8,0
				7,3
				7,0
				6,1
A2963	38.00 S, 15.00 E	600	6,5	5,0
			7,0	
			6,0	
			5,6	
A2966	38.09 S, 19.50 E	600	7,2	6,8
			4,9	6,8
A2968	36.38 S, 16.28 E	600	4,9	5,0
A3616	31.19 S, 10,08 E	250	6,9	8,2
			7,0	6,3
			7,1	7,2
			6,6	
			7,9	
			7,5	
			6,6	
			7,0	
			7,6	
			6,5	
			7,0	
A3634	33.23 S, 09.31 E	250	6,8	6,8
			6,2	
			6,9	
A3641	37.00 S, 08.40 E	S	5,6	7,0
			6,9	7,0
			7,5	7,0
			7,0	7,0
			6,9	7,0
			6,9	7,2
				6,7
A3643	36.51 S, 12.43 E	250		8,9
				5,0
A4218	29.13 S, 10.03 E	100	7,2	8,0
			6,0	7,9
			5,4	7,9
			5,8	7,5

Gennadas incertus (Balss, 1927)

Fig. 7

Amalopenaeus incertus Balss, 1927: 265, figs 24–29.
Gennadas incertus: Burkenroad, 1936: 66. Tirmizi, 1960: 364, figs 76–80.
Gennadas gardineri Balss, 1927: 267, fig. 31.

Description

Antennal and infra-antennal angles acute. Spine on outer scaphocerite margin reaching beyond apex of scale. Thelycum in female with large plate on 8th thoracic sternite, anteriorly and posteriorly notched. Plate on 7th thoracic sternite with antero-lateral corners acute, postero-lateral corners produced anteriorly. 6th thoracic sternite with large concave shield. Petasma in male with external lobe of 2 large divergent tapering 'horns'. Median lobe of 2 lobules, outer slender, inner broadly rounded. Internal lobe simple, with hooks on median face. Accessory lobe truncate, reaching same level as median and internal lobes. Inner scale of appendix masculina of male distally cut away at angle.

Distribution

Indian Ocean.

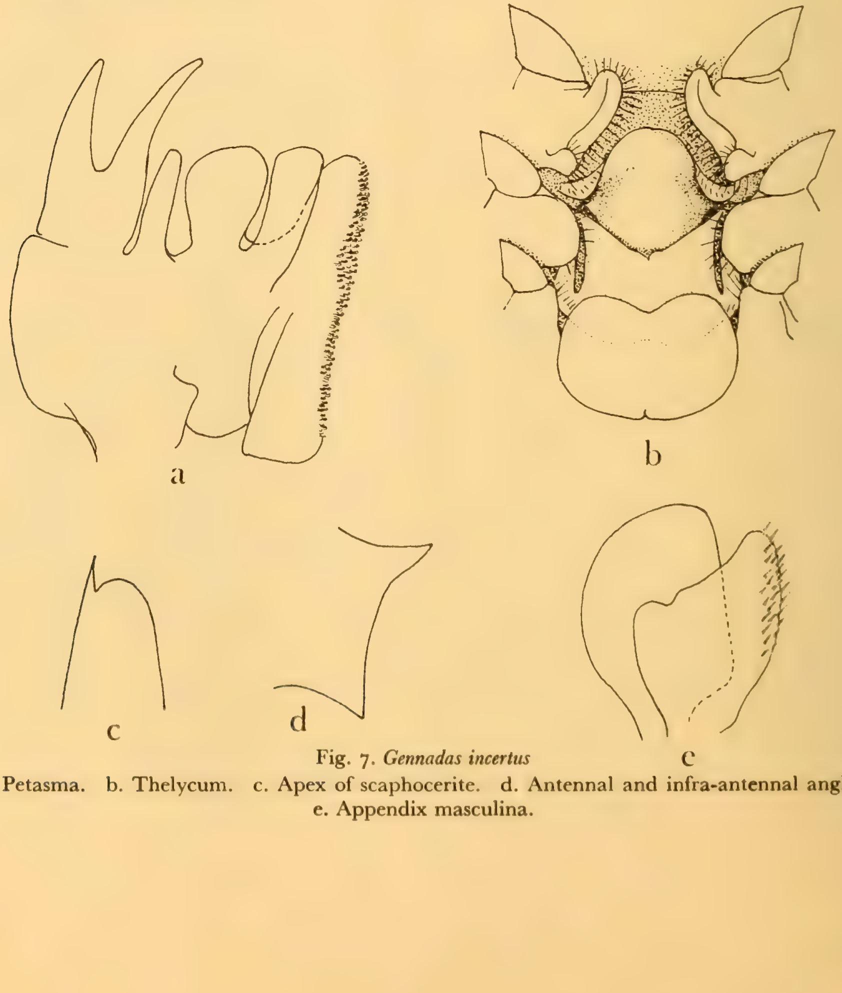

Fig. 7. *Gennadas incertus*

a. Petasma. b. Thelycum. c. Apex of scaphocerite. d. Antennal and infra-antennal angles. e. Appendix masculina.

Material

Station	*Position*	*Depth (metres)*	*C.L.♂ (mm)*	*C.L.♀ (mm)*
IK6 . .	34 S, 17 E	200	7,2	6,6
				6,8
IK35 . .	25.55 S, 39.30 E	500	6,3	
IK41 . .	36.47 S, 34.40 E	500	7,0	
IK42 . .	35.42 S, 24.40 E	500	7,0	6,9
				7,5
IK48 . .	29.52 S, 31.36 E	500	5,0	7,6
			5,2	
IK51 . .	33.10 S, 17.20 E	120	5,4	6,2
A2945 . .	36.11 S, 14.14 E	700	7,4	
A2963 . .	38.00 S, 15.00 E	600	6,6	
A2965 . .	40.17 S, 19.54 E	600	7,5	6,9
A3643 . .	36.51 S, 12.43 E	250		5,6

Gennadas kempi Stebbing, 1914
Fig. 8

Gennadas kempi Stebbing, 1914*a*: 283, pl. 27; 1914*b*: 12. Calman, 1925: 4. Burkenroad, 1936: 64, figs 52, 54. Barnard, 1950: 630, fig. 118a–d. Kensley, 1968: 302.
Amalopenaeus kempi: Balss, 1927: 260, figs 14, 15.

Description

Antennal angle produced but bluntly rounded, infra-antennal angle rounded. Spine on outer margin of scaphocerite set well behind apex of scale. Thelycum of female consisting of 3 sternal plates, that on 6th thoracic sternite triangular, 7th thoracic sternite rectangular, 8th thoracic sternite hexagonal. Petasma of male with single acute external lobe, median lobe broad, truncated, internal lobe also truncate, with rounded hook-bearing process. Both lamellae of appendix masculina of 2nd pleopod of male somewhat elongate.

Distribution

Off west coast of South Africa, off Cape Peninsula, Agulhas Basin, southern Indian Ocean.

Material

Station	*Position*	*Depth (metres)*	*C.L.♂ (mm)*	*C.L.♀ (mm)*
A190 . .	32.26 S, 16.33 E	2 200	8,2	
			D	
A321 . .	34.33 S, 16.42 E	3 200–3 400	D	D
				9,8
A1877 . .	40.44 S, 33.36 E	500		10,0

Station	*Position*	*Depth (metres)*	*C.L.♂ (mm)*	*C.L.♀ (mm)*
A1879	43·29 S, 35·14 E	500	10,2	10,8
			9,9	12,0
			9,9	12,0
A2393	43·50 S, 25·00 E	800		10,9
A2953	44·24 S, 20·16 E	600		7,5
A2958	41·40 S, 17·17 E	600	8,9	10,0
			8,0	10,9
				9,9
				10,7
				7,3
				10,8
				9,0
				11,0
				D
				8,1
A3643	36·51 S, 12·43 E	250		8,0

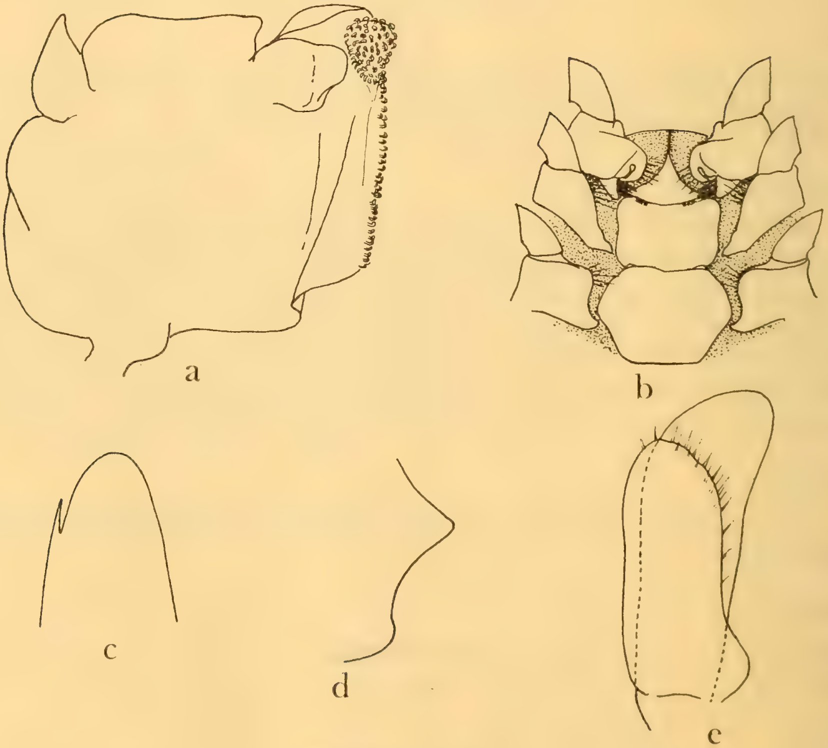

Fig. 8. *Gennadas kempi*

a. Petasma. b. Thelycum. c. Apex of scaphocerite. d. Antennal and infra-antennal angles. e. Appendix masculina.

Gennadas parvus Bate, 1881
Fig. 9

Gennadas parvus Bate, 1881: 192; 1888: 340, pl. 59. Kemp, 1909: 721, pl. 73, figs 1–6, pl. 75, fig. 1; 1913: 60, pl. 7, fig. 6. Burkenroad, 1936: 65. Tirmizi, 1960: 346, figs 49, 50.
Amalopenaeus parvus: Balss, 1927: 263, figs 20–23.

Description

Antennal and infra-antennal angles acute. Spine on outer scaphocerite margin small, below apex of scale. Thelycum of female with broad shield on 8th thoracic sternite with 2 depressions on either side of slight median ridge. 7th sternite with broad-based triangular shield. Rectangular structure beneath apex of triangle made up of 3 plates. Leaf-like process between bases of 3rd and 4th pereiopods. Petasma of male with bipartite external lobe, outer lobule hook-like, inner lobule broad, truncate. Median lobe bipartite, with elongate outer lobule, and broader inner lobule at right angles to former. Short blunt process between external and median lobes. Internal lobe distally elongate, rounded, with numerous hooks. Accessory lobe a mere ridge beneath median lobe.

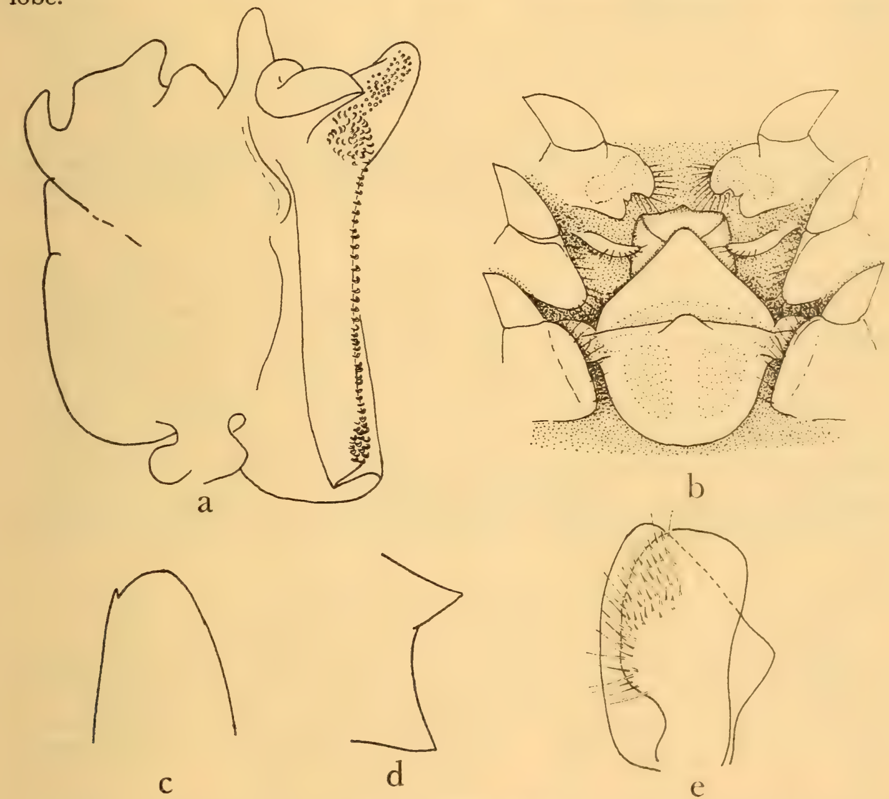

Fig. 9. *Gennadas parvus*
a. Petasma. b. Thelycum. c. Apex of scaphocerite. d. Antennal and infra-antennal angles. e. Appendix masculina.

Distribution

Indo-Pacific, off Cape of Good Hope.

Material

Station	*Position*	*Depth (metres)*	*C.L.♂ (mm)*	*C.L.♀ (mm)*
A1892	36.28 S, 41.22 E	1 000	5,4	5,8
A1896	34.12 S, 28.24 E	1 000		5,9
A2394	44.40 S, 26,05 E	S	6,2	6,4
			6,5	
			5,8	
A2961	40.12 S, 14.41 E	700	6,2	
			6,9	
A2965	40.17 S, 19.54 E	600	6,8	
A2966	38.09 S, 19.50 E	600	6,8	
A3616	31.19 S, 10.08 E	250	5,2	
A3634	33.23 S, 09.31 E	250	6,4	
			6,6	
A3643	36.51 S, 12.43 E	250		5,0

Gennadas scutatus Bouvier, 1906

Fig. 10

Gennadas scutatus Bouvier, 1906: 748; 1908: 42, pl. 8. Kemp, 1909: 727, pl. 75, fig. 2; 1910*a*: 178, pl. 13, figs 9, 10; 1913: 61. Calman, 1925: 4. Burkenroad, 1936: 83, fig. 59. Barnard, 1950: 634, fig. 1180, p. Tirmizi, 1960: 358, fig. 40c, 48d, 67–69. Crosnier & Forest, 1969: 549.

Amalopenaeus scutatus: Balss, 1927: 258, figs 11, 12.

Description

Antennal and infra-antennal angles acute. Spine on outer scaphocerite margin reaching beyond apex of scale. Thelycum of female with elongate flap on 8th thoracic sternite, stretching forward to cover 7th and 6th sternites. 7th sternite a flattened triangle. 6th sternite triangular with seminal receptacles visible under flap of 5th sternite. Petasma of male with external lobe of 2 short rounded lobules. Median lobe broad, consisting of slender outer lobule, and inner broadly rounded lobule with tiny lobe on outer margin. Internal lobe of 2 low rounded hook-covered portions. Accessory lobe a simple triangular flap.

Distribution

North and South Atlantic, Caribbean, entire Indo-Pacific region.

Material

Station	*Position*	*Depth (metres)*	*C.L.♂ (mm)*	*C.L.♀ (mm)*
IK6	34 S, 17 E	200	5,4	5,0
			5,1	4,9
			5,4	5,3
			5,4	

Station	*Position*	*Depth (metres)*	*C.L.♂ (mm)*	*C.L.♀ (mm)*
A321 . .	34.33 S, 16.42 E	3 200–3 400		5,8
A2953 . .	44.24 S, 20.16 E	600	5,1	

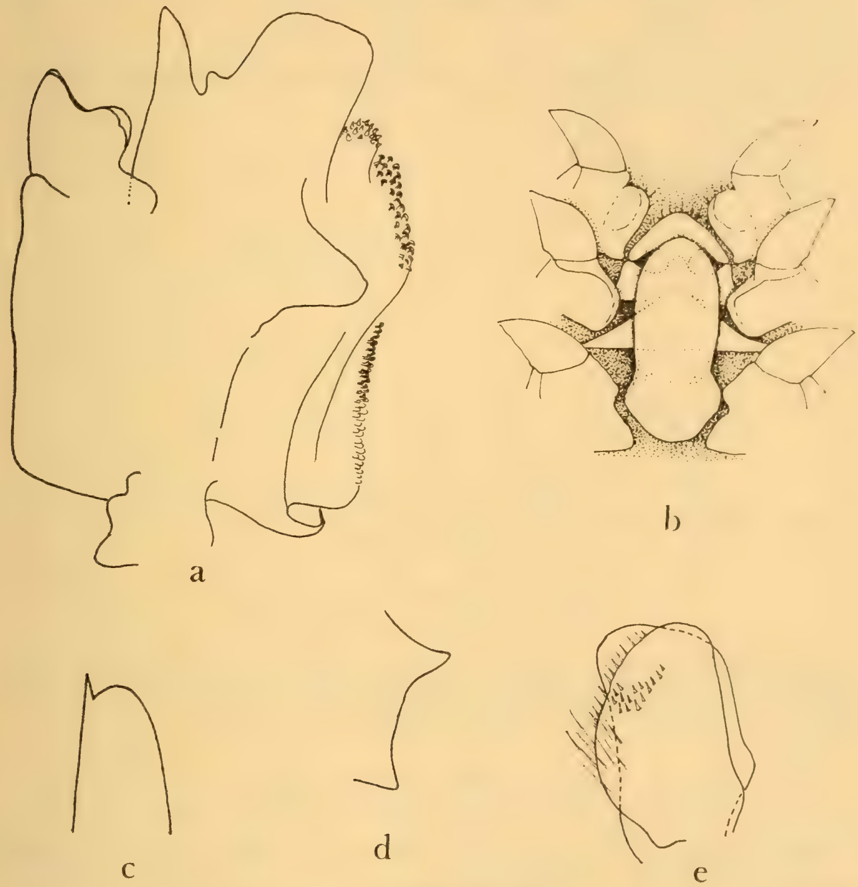

Fig. 10. *Gennadas scutatus*
a. Petasma. b. Thelycum. c. Apex of scaphocerite. d. Antennal and infra-antennal angles. e. Appendix masculina.

Gennadas talismani Bouvier, 1906
Fig. 11

Gennadas talismani Bouvier, 1906: 10, fig. 15; 1908: 28. Lenz & Strunck, 1914: 311, pl. 18, figs 1–14. Burkenroad, 1936: 66, 85, fig. 60. Barnard, 1950: 633, fig. 118i, j. Crosnier & Forest, 1969: 549.
Amalopenaeus talismani: Balss, 1927: 254, figs 5–7.

Description

Antennal and infra-antennal angles acute. Thelycum in female with shield on 8th thoracic sternite notched anteriorly and posteriorly. 7th sternite with broadly rectangular plate, with anterior ridge marking position of seminal receptacles. Petasma in male with external lobe consisting of 2 low apically acute lobules. Median lobe bipartite, outer lobule broad, inner lobule slender. Interior lobe rounded. Accessory lobe a broad flap.

Distribution

North and South Atlantic, not as yet known from southern African waters.

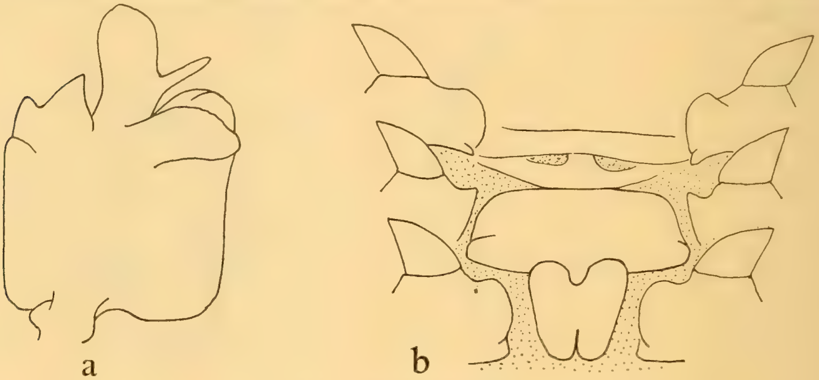

Fig. 11. *Gennadas talismani*

a. Petasma (after Balss, 1927, and Bouvier, 1906). b. Thelycum (after Balss, 1927, and Burkenroad, 1936).

Gennadas tinayrei Bouvier, 1906

Fig. 12

Gennadas tinayrei Bouvier, 1906: 10, figs 2–4, 14; 1908, 48, pl. 1, fig. 4, pl. 10. Stephensen, 1923: 11. Burkenroad, 1936: 73, fig. 56. Tirmizi, 1960: 367, figs 40f, 81–83.
Amalopenaeus tinayrei: Sund, 1920: 29. Balss, 1927: 252, fig. 2, pl. 6, fig. 1.

Description

Antennal angle subacute, infra-antennal angle acute. Spine on outer scaphocerite margin just reaching apex of scale. Thelycum of female with small rectangular shield on 8th thoracic sternite. 7th sternite with broad-based triangular shield, with 2 rounded processes on either side of apex. 5th thoracic sternite with tongue-like median process, posteriorly directed. Petasma in male with external lobe apically divided into 2 low subapical lobules, bearing several small blunt hooks, and with small lobe at base. Median lobe broad evenly convex. Internal lobe consisting of 2 rounded hook-covered portions. Accessory lobe broadly rounded.

Distribution

Indian Ocean, North and South Atlantic.

Material

Station	*Position*	*Depth (metres)*	*C.L.♂ (mm)*	*C.L.♀ (mm)*
A2953 . .	44.24 S, 20.16 E	600	6,0	
A4218 . .	29.13 S, 10.03 E	100	6,9	6,9
			7,0	

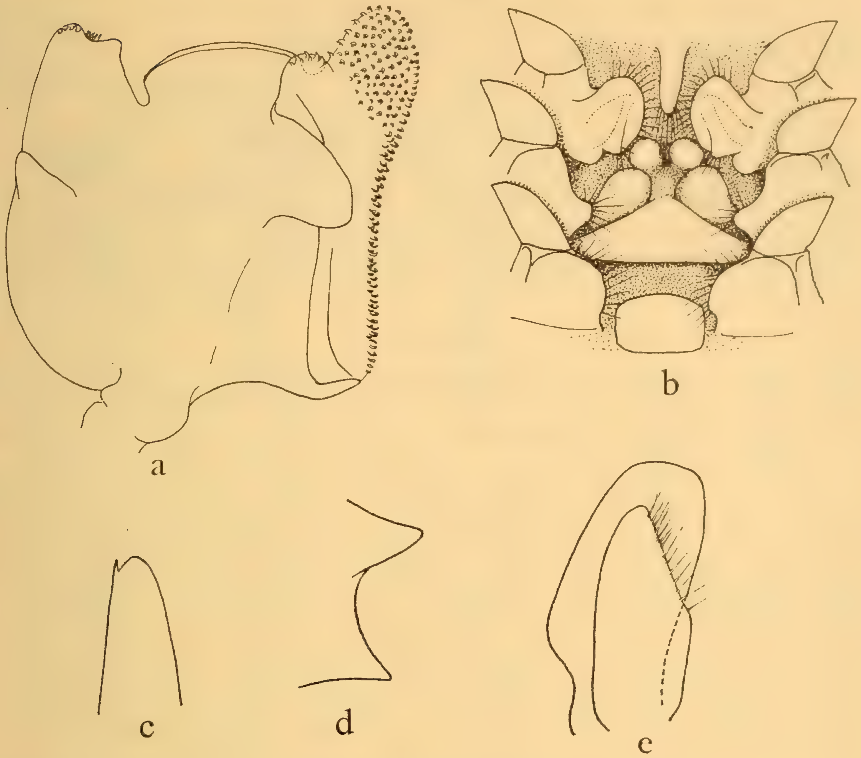

Fig. 12. *Gennadas tinayrei*
a. Petasma. b. Thelycum. c. Apex of scaphocerite. d. Antennal and infra-antennal angles. e. Appendix masculina.

Gennadas valens (Smith, 1884)
Fig. 13

Amalopenaeus valens Smith, 1884: 402, pl. 10, fig. 2. Balss, 1927: 253, fig. 4.
Gennadas valens: Bouvier, 1908: 34, pl. 1, fig. 3, pl. 9. Stephensen, 1923: 12. Burkenroad, 1936: 75, fig. 57. Barnard, 1950: 631, fig. 118k, l.

Description

Antennal and infra-antennal angles acute. Spine on outer scaphocerite margin reaching slightly beyond apex of scale. Thelycum in female with almost circular shield on 8th thoracic sternite. 7th thoracic sternite with 2 anteriorly-directed triangular processes, anterior end of same sternite with semi-circular raised area. Seminal receptacles just posterior to similar raised area on 6th sternite. Coxa of 4th pereiopod with medially-directed lobe, bearing smaller tooth-like process on anterior margin. Petasma in male with external lobe bipartite, inner lobule smaller than outer. Median lobe consisting of 3 blunt sub-equal lobules. Internal lobe of 2 rounded hook-covered portions. Accessory lobe large, rounded.

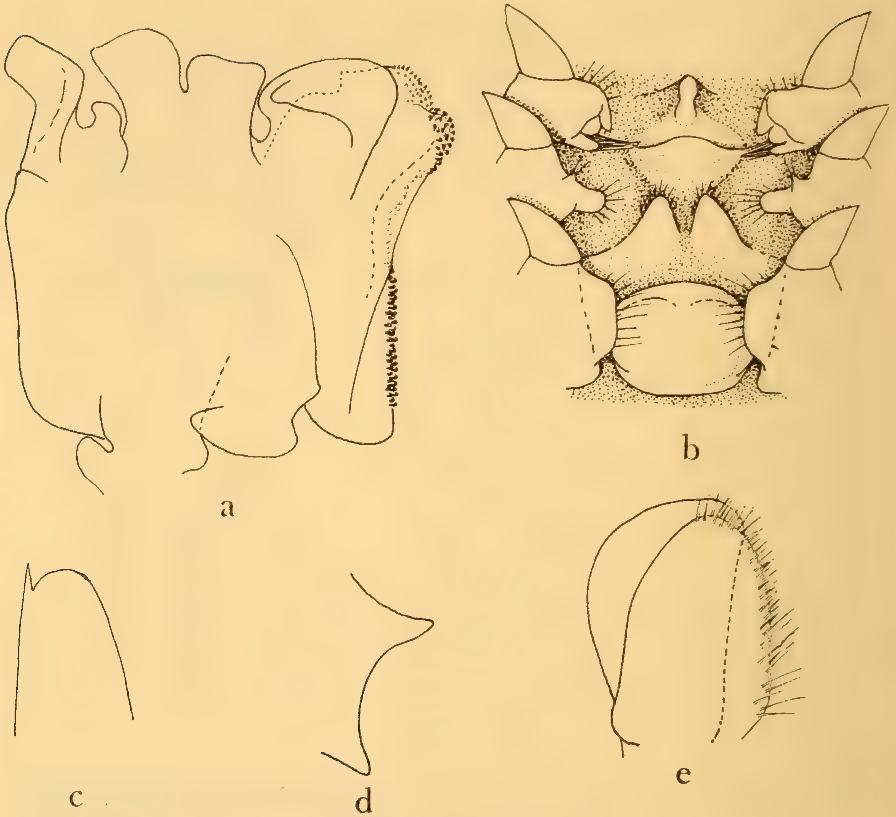

Fig. 13. *Gennadas valens*
a. Petasma. b. Thelycum. c. Apex of scaphocerite. d. Antennal and infra-antennal angles. e. Appendix masculina.

Distribution

North and South Atlantic, Caribbean.

Material

Station	*Position*	*Depth (metres)*	*C.L.♂ (mm)*	*C.L.♀ (mm)*
A3634	33.23 S, 09.31 E	S	7,9	9,8
A3641	37.00 S, 08.40 E	S	11,2	10,0
			7,9	
A4218	29.13 S, 10.03 E	100	10,1	10,0
			10,0	9,2
				8,0

SUMMARY

The South African representatives of the penaeid genus *Gennadas* are discussed. Thirteen species have been recorded from the area, eleven of which

(including four new records) are represented in the present collection. The species are figured, and brief descriptions are given, to assist with their identification.

Acknowledgements

My grateful thanks are due to the following scientists for allowing me to examine material: the Director of the Division of Sea Fisheries, Cape Town; Professor J. H. Day of the University of Cape Town; Dr. J. R. Grindley and Mr. M. J. Penrith for material collected while they were both attached to the South African Museum.

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INSTRUCTIONS TO AUTHORS

Based on

CONFERENCE OF BIOLOGICAL EDITORS, COMMITTEE ON FORM AND STYLE. 1960.
Style manual for biological journals. Washington: American Institute of Biological Sciences.

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REFERENCES

Harvard system (name and year) to be used: author's name and year of publication given in text; full references at the end of the article, arranged alphabetically by names, chronologically within each name, with suffixes *a*, *b*, etc. to the year for more than one paper by the same author in that year.

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To be governed by the rulings of the latest *International code of zoological nomenclature* issued by the International Trust for Zoological Nomenclature (particularly articles 22 and 51). The Harvard system of reference to be used in the synonymy lists, with the full references incorporated in the list at the end of the article, and not given in contracted form in the synonymy list.

Example

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